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STEEL

The Magazine of Metalworking and Metalproducing

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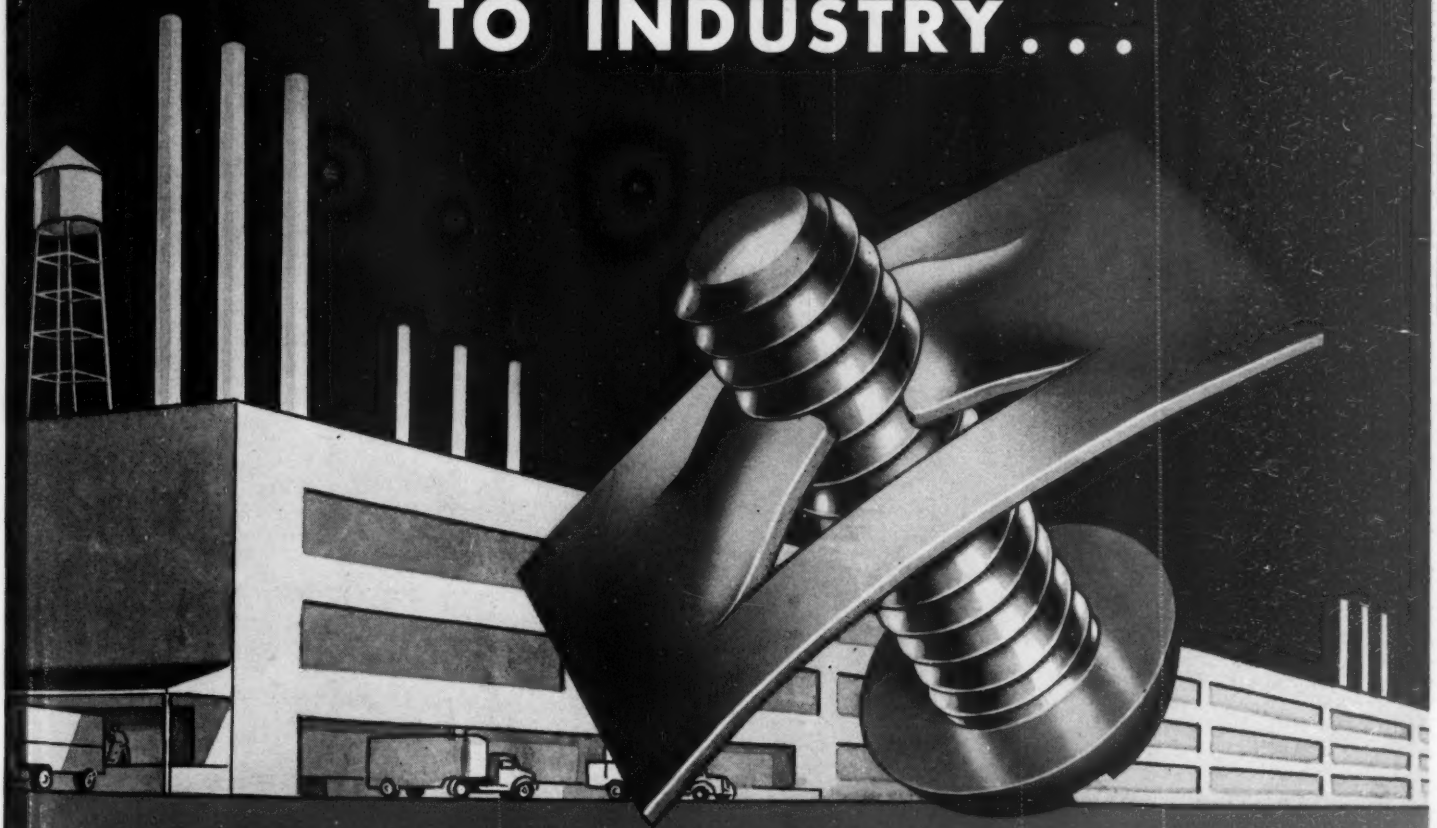
A LITTLE FASTENER MAKES A BIG CONTRIBUTION TO INDUSTRY...



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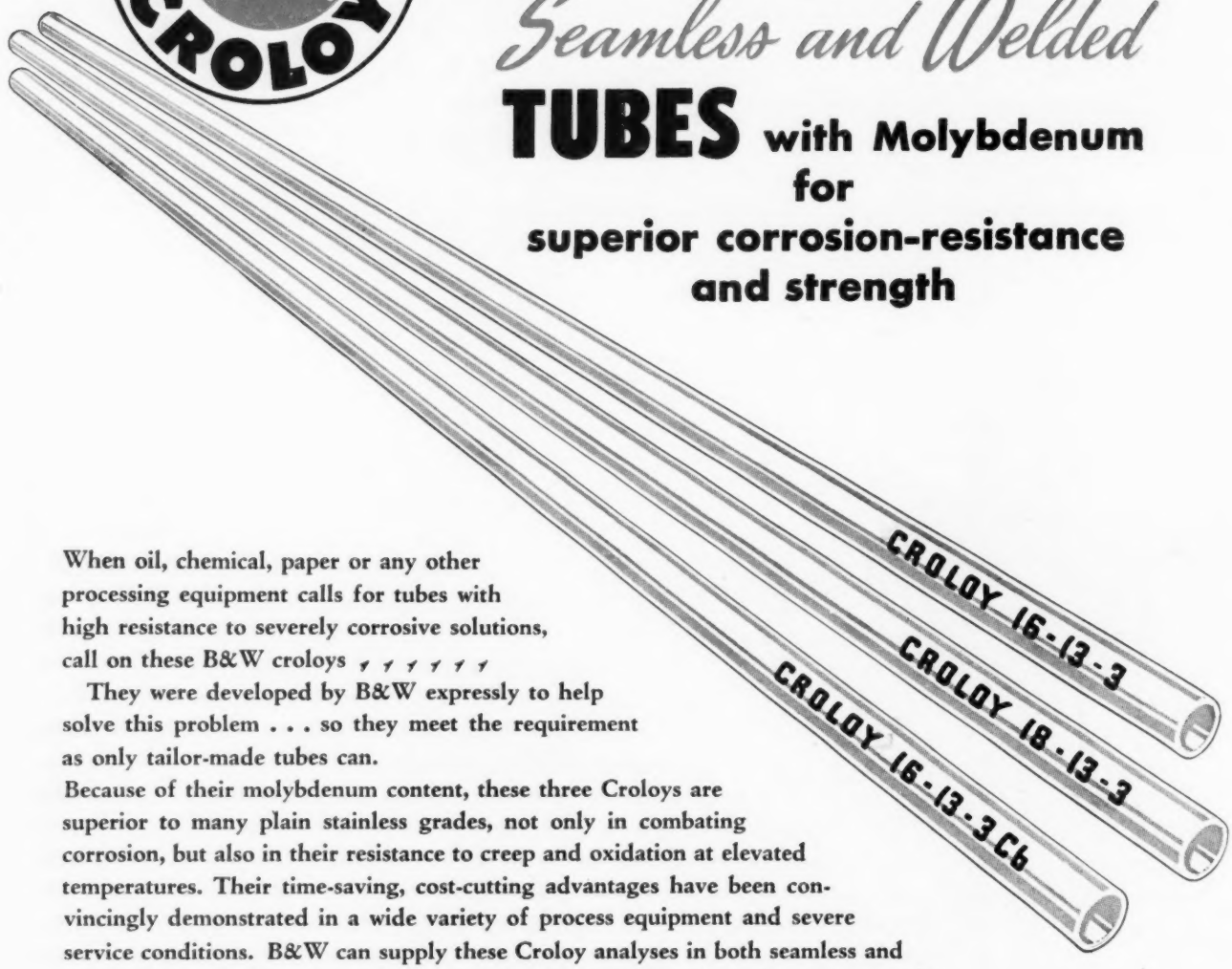

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STEEL

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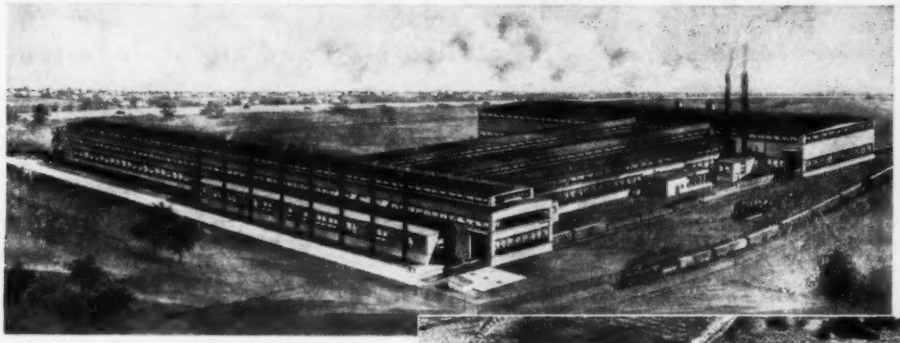

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Dependable Dan Our Customers' Man Invites Correspondence Regarding Your Normal and Regular Requirements

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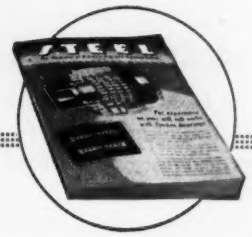


October 25, 1948

Real Selling Job

One of the most thought-provoking addresses we have seen in a long time was that presented as a "Report on Public Relations" to the annual meeting of the National Machine Tool Builders' Association by Jerome A. Raterman, president of Monarch Machine Tool Co. and chairman of the association's Committee on Public Relations.

Mr. Raterman reasons that if a manufacturer's product were under fire from competitors and from customers, that manufacturer would do three things. He would find out just what the competitors were saying about the product, find out what the customers were saying and then make a further study of the product to see if the criticisms or complaints were justified.

According to Mr. Raterman's report, industry should adopt these same tactics in dealing with attacks on the free enterprise system. The competitors of this system are the exponents of Communism and Socialism. The customers are all the people of the United States and "potentially the general public everywhere."

Following the procedure of the manufacturer, industrial executives should find out what the Communists are saying about our system. They should read the Daily Worker and other Communist propaganda occasionally to keep track of the competitors' "line." They also should be even more alert to what the customers (the people) are saying about the free enterprise system.

A striking sample of what too many people believe is found in the criticism of the capitalistic system by the World Council of Churches which met in Amsterdam in September. It charged that capitalism tends to subordinate the meeting of human needs to the economic advantages of those who have the most power over its institutions, that it tends to produce serious inequalities, that it has placed the greatest emphasis on success in making money and that it keeps the people of capitalistic countries subject to insecurity because of the ups and downs of the economic cycle.

In the face of such fire from competitors and customers, concludes Mr. Raterman's report, American industry must tackle the job of selling the free enterprise system as if it were a new product. This means real selling in one's own community, based on human contacts. Public relations, like charity, he says, begins at home.

* * *

AMAZING, BUT SPOTTY: If one were to ask industrial executives what conditions within industry itself would be best for the national economy under existing circumstances, many would agree readily that high-level production and an orderly retreat from high prices would be most desirable.

In spite of the fact we are approaching a presidential election, business right now is conforming quite closely to this ideal formula. In general, production is at a peacetime peak and prices, on the average, are declining moderately. If conditions are so favorable on the surface, why is it that business sentiment is sluggish?

One reason is that the unprecedented high level of a few important barometers obscures a number of disconcerting weaknesses. Steel output is running along at 98 per cent of capacity, automobile assemblies are touching a new postwar peak, daily crude oil production hit a new high in the week ended Oct. 9 and electric power output is at record levels. Also the index of wholesale prices for all commodities, compiled

(OVER)

AS THE EDITOR VIEWS THE NEWS

by the Bureau of Labor Statistics, has been declining steadily for several weeks.

At the same time, however, railroad car loadings are off from last year. So is bituminous coal production. Machine tool builders are operating at about 50 per cent of capacity. Also the decline in commodity prices is due to reductions in some food products that are so drastic that they outweigh price increases in some other commodities.

In many respects, current industrial activity really is amazing, but it also is spotty. —p. 58

* * *

GOOD NEWS AND BAD: Speaking at the annual meeting of the Gray Iron Founders' Society, John A. Claussen, secretary of American Iron & Steel Institute's Merchant Pig Iron Committee, said the outlook for an improved supply of foundry iron is more favorable than at any time since the end of the war. Most of the stacks down for repairs in recent months will be back in production by the year-end, supplies of ore and coke will be adequate and imports of pig iron, recently ranging from 13,000 to 15,000 tons monthly, are tending upward.

The outlook for finished steel still is grim. At the annual meeting of the National Association of Sheet Metal Distributors, Norman W. Foy, general manager of sales of Republic Steel Corp., predicted that 1949 will see even less steel available for free unrestricted distribution than in the present year. No relief is in sight for the average steel consumer in the foreseeable future, he believes, in spite of new peacetime production records. —pp. 42, 43

* * *

ALL QUIET ON POTOMAC: Judging from reports from Washington, government officials are so certain that a change in administration will be ordered on Nov. 2 that many federal office-holders are marking time, awaiting new bosses.

This is not surprising. If a new administration is elected, it will be called upon to make more than the normal number of personnel changes for the reason that the incumbent administration has held office for an unusually long time. Adjustments after a 16-year tenure of office certainly will be more drastic than those following a regime of 4, 8 or 12 years.

Nevertheless, there is a strong possibility that the changes in personnel may be much more striking than the changes in administrative policy. Mr. Dewey's campaign speeches are those of a man who seems to be accepting many of the social and economic developments of recent years as inevitable concomitants of world upheaval.

On the basis of his campaign utterances, he is not intending to turn the clock back to the "good old days." —p. 46

* * *

WHERE INCHES COUNT: Word from Flint is that the new 1949 Buick models have a shorter wheelbase and a 3-inch shorter overall length, following the trend initiated by Cadillac and the Olds 98 series. "This," it is explained, "is in recognition of the difficulties encountered by owners in garaging and parking automobiles which were steadily stretching out to the point where handling was becoming a serious problem."

If the recent trend of ever-increasing overall car length really is being arrested or—better yet—is in process of being reversed, it is good news to millions of motorists. Most owners cherish the easy riding qualities made possible by a long wheelbase and they likewise approve heavier bumpers for protection. However, they draw the line at needless extra length, particularly if it necessitates the building of an ugly extension to the backwall of the garage. —p. 53

* * *

PRECISION TUMBLING: During World War II, the old practice of tumbling or barrel-finishing came into play in many plants where mechanical deburring and polishing became a "must" because of the prohibitive cost and amount of time consumed when these operations were performed by hand labor. Many of the innovations developed under pressure in war plants have been further refined and now are being utilized in numerous metalworking establishments on peacetime products.

Among these refinements are a number of processes in which special chips and compounds, used in connection with barrel-finishing techniques, can produce closely controllable results in grinding, deburring, polishing and coloring.

On mass production work, economies in these operations can be increased appreciably if the design of the product is adapted to a few basic requirements of these precision tumbling processes. —p. 68

E. L. Shaner

EDITOR-IN-CHIEF

News Summary

SCRAP FROM GERMANY— Although a few cargoes of scrap are arriving in this country from Germany and shipments are expected to increase over the next few months, the total received from abroad will not be sufficient to correct the shortage here (p. 39). Shipments over the next 12 months are not likely to exceed a million tons, although Germany is estimated to have at least 18 million tons of rubble scrap. Handling of the German scrap problem is subject to considerable criticism.

WASHINGTON MARKS TIME— The national Capital is strangely inactive. Almost universal belief that a change in administration will be ordered by the voters next week has caused lethargy among the incumbents (p. 46). Few new projects are being undertaken because officials believe they will have new bosses and new policy before such projects could be completed.

PRICING— Four members of the Federal Trade Commission have issued a memorandum purporting to clarify the effects of recent court decisions and FTC actions on geographic pricing practices. While holding that basing point systems, zone pricing and similar methods are not illegal per se, the commissioners point out that f.o.b. mill pricing is less suspect of possible law violations (p. 40). Meanwhile, the fifth commissioner, Lowell B. Mason, who has been in disagreement with his colleagues, urges industrialists to press for legislative correction of the pricing muddle (p. 42).

STEEL DISTRIBUTION— Auto builders received more than a half million more tons of steel in the first half of 1948 than in the comparable 1947 period (p. 41). Almost half of the increase in this year's production is going to the automotive industry. The construction industry and warehouses also are getting substantially more steel this year than last. Less steel is going for export, oil and gas drilling, machinery and ordnance.

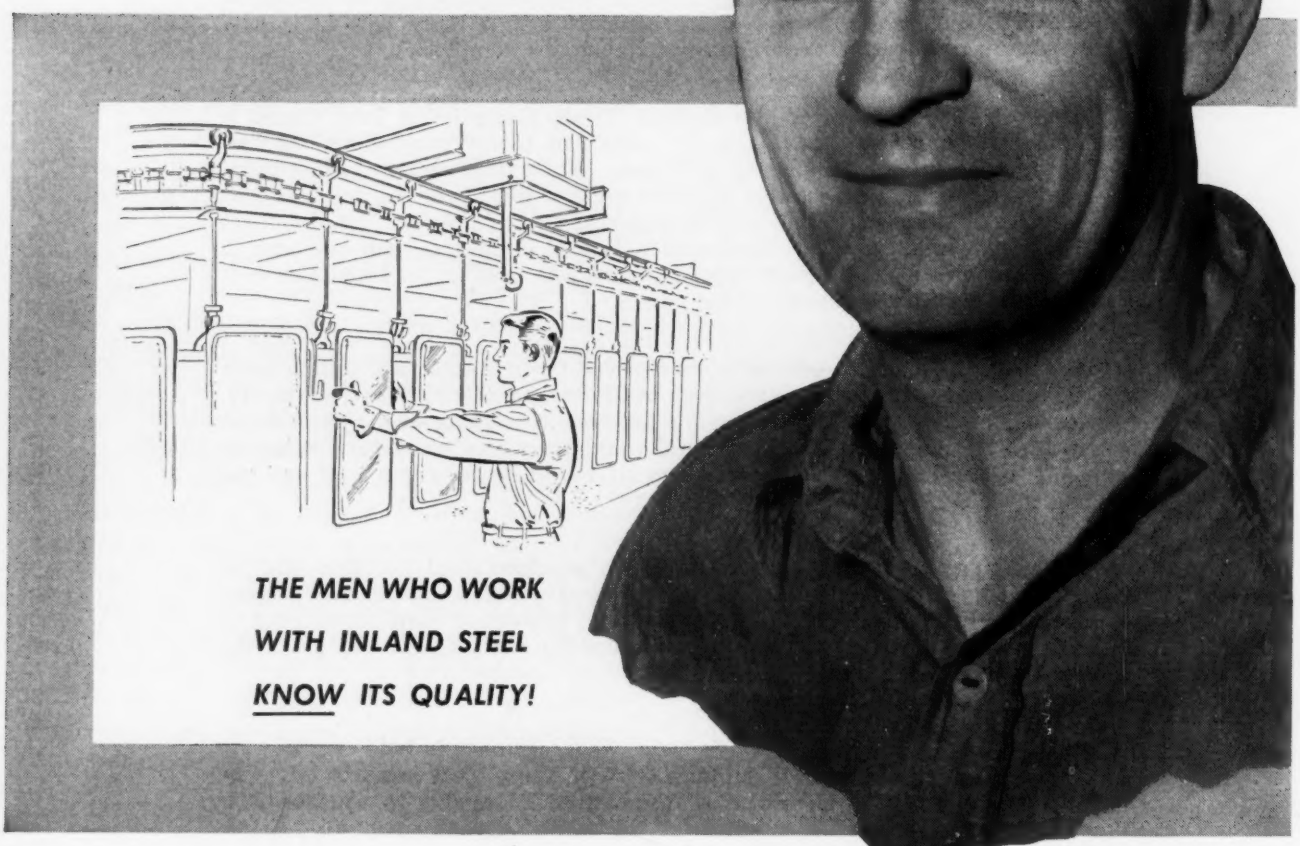
TOOL BUILDERS LOOK AHEAD— American machine tool builders will be asked to produce 100,000 new units within 12 months if this country goes to war, posing a terrific problem as the industry would require at least six months to work up to such a production rate. This was the warning (p. 44) given the NMTBA last week in Atlantic City.

MORE IRON FOR FOUNDERS— A little encouragement is held out to gray iron founders for future pig iron supplies (p. 43). Many blast furnaces have undergone repairs and the likelihood of production losses due to shutdowns is diminishing. Ore and coke supplies for the winter appear adequate. A fair tonnage of iron is being received from abroad.

EUROPE— Steel and metalworking production in Europe is rising despite the international unrest, strikes and shortages of raw materials. Britain is expected to exceed its 14-million ton goal in steel output by at least a million tons. Currency reform in Western Germany has helped production in that area. Belgium, Luxemburg and Italy have increased output and prospects for further increases are bright. Labor troubles continue to bedevil France.

HERE AND THERE IN INDUSTRY—Steel company earnings for third quarter show a sharp rise (p. 39) . . . New Buicks will have a shorter wheelbase and less overall length to facilitate parking and garaging (p. 53) . . . Gas industry construction through 1952 will require $3.3 billion (p. 56) . . . Hard-to-sell surplus industrial properties will be disposed of at public auctions (p. 50) . . . Henry J. Kaiser has offered to lease the Gadsden, Ala., blast furnace now being operated by Republic Steel Corp. (p. 50) . . . Increased output of silicon steel for the electrical industry will be made possible by recently completed modernization of Carnegie-Illinois' Vandergrift plant (p. 56) . . . Industrial production continues to hum along at a postwar peak of 175 per cent of the 1936-39 average (p. 58).

"I Like the UNIFORMITY of Inland Steel"



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Scrap Import Prospects Dismal

Shipments to this country from Germany not likely to exceed million tons in next 12 months. Available supply split on 40:40:20 ratio between U. S., Britain and other claimants

SCRAP shipments from Germany to American steel mills and foundries over the next 12 months are not likely to exceed a million tons.

This was the not-too-encouraging picture presented last week to the Macy committee, latest of many agencies seeking a solution to the two-year-old problem of expediting a mass flow of plentiful German rubble scrap to consumers in this country.

Mission after mission, including one appointed by the President, has gone to Germany to seek a solution to the problem, but the results have been almost nil. Depending on which involved party is doing the talking, the blame for the impasse is saddled on the State Department, the Army, on other government entities, on the Germans, and even on the steel industry itself.

Early Gain Seen—Imports from Germany should show a substantial gain in the next three or four months, Gen. William H. Draper Jr., under secretary of Army, told the committee. He estimated that the Germans, can prepare between 2 million and 3 million tons of rubble scrap for export over the next year, and pointed out that the United States will receive 40 per cent of this tonnage; 40 per cent will go to the British and the remaining 20 per cent will be divided among other claimants. This ratio of distribution of available scrap is contained in a recent agreement between American and British commanders in the Bizone. Under this agreement, the price for heavy melting steel is fixed at $28.50 f.a.s. North German ports, and $52.50 for No. 1 cupola cast.

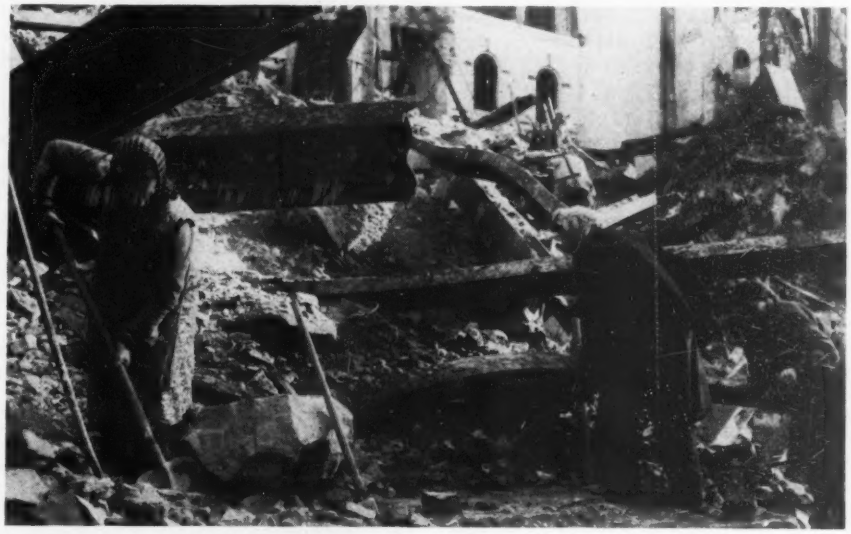
Other European countries and Canada are asking for divvy in the German scrap distribution and a committee of the Organization for European Economic Cooperation has been invited to submit proposals for the allocation of such material.

Latest estimates indicate Germany has 18 million tons of rubble scrap.

American Claims Lacked Force—Representative Macy, chairman of the trade practice subcommittee, opined that United States claims for German scrap were not presented with sufficient force. He pointed out that the British obtained some 650,000 tons of "booty" scrap free, and, in addition, bought about 150,000 tons, while the United States has brought in about 70,000 tons, plus an undetermined tonnage brought in by the Army. Representative Macy thought it strange that the British with 15 million tons of steel capacity were obtaining a greater share of German scrap than the United States with its 90 million tons of capacity.

No Scrap for Stockpiling—The subcommittee was startled by a statement by Isaiah Frank, of the State Department's Natural Resources Division, that the department has decided not to attempt to negotiate bilateral agreements under which ferrous scrap would be shipped to the United States for stockpiling. Inasmuch as Congress specifically stated in the Economic Cooperation Act that the State Department was to negotiate such deals with participating European nations, the subcommittee indicated it will investigate this phase further.

Who Will Buy?—On the question of whether this country's purchases of German scrap should be made through a single buying agency, as recommended by the Department of Commerce, or through private importers, wide differences of opinion were expressed.



German women dig heavy steel girders from rubble in Berlin. Latest estimates place the amount of rubble scrap in Germany at 18 million tons. NEA photo

Steel Earnings Increase Shown

NET INCOME of the steel industry in the tihrd quarter increased substantially, if performance of the first few companies to report is characteristic of other producers.

Republic Steel Corp., Cleveland, had third-quarter net income of $12,874,398, compared with $7,805,410 in second quarter, $9,132,980 in first quarter, and $6,380,016 in the third quarter of 1947. This makes the 1948 nine-month total $29,812,788, compared with $23,111,630 in the corresponding period of last year.

Republic's sales and operating revenues in the 1948 third quarter were $196,859,351, substantially above either of the first two quarters of 1948 or the third quarter of 1947.

Reports Earnings Gain — Portsmouth Steel Corp., Portsmouth, O., shows net income of $1,107,101 for the third quarter of 1948, compared with $904,915 in second quarter, $1,028,545 in first quarter, and $907,451 in the third quarter of 1947. Net income in the first nine months of 1948 totaled $3,040,561, compared with $2,941,130 in the like period of 1947. Portsmouth also reported 1948 third-quarter net sales ex-

ceeded those of each of the first two quarters of 1948 and the third quarter of 1947. The 1948 third quarter net sales were $14,878,990.

Continental Steel Corp., Kokomo, Ind., had third-quarter net income of $407,838, an increase over second quarter's $406,254, first quarter's $213,417, and 1947 third quarter's $357,036.

Crucible Steel Co. of America, New York, shows third-quarter net earnings of $989,754, substantially above second quarter's $633,757, first quarter's $567,786, and 1947's third quarter figure of $23,639.

Decline Noted—In contrast, a steel finisher, Thomas Steel Co., Warren, O., reports net sales and net earnings for the 1948 third quarter were below those of each of the first two quarters of the year. Its net earnings for the third quarter were $403,008 compared with $542,878 in second quarter, and $411,606 in first quarter. Net earnings in 1947's third quarter were $379,966.

Two producers of pig iron report earnings increased in the third quarter. Interlake Iron Corp., Cleveland, shows net earnings in that period were $1,268,684, compared with $1,223,688 in second quarter, $1,146,506 in first quarter, and $1,251,043 in 1947's third quarter. Sloss-Sheffield Steel & Iron Co., Birmingham, had a third-quarter net income of $639,992 compared with $609,369 in second quarter, $529,819 in first quarter, and $480,251 in the 1947 third quarter.

New Coast Tin Plate Mill Opened

OFFICIAL opening Oct. 21 of the new cold reduction sheet and tin plate mill at the Pittsburg, Calif., plant of Columbia Steel Co., subsidiary of United States Steel Corp., marked the addition of more than 300,000 net tons annually to the supply of steel products made by West Coast steel plants for western industry.

New production units at Columbia's Pittsburg sheet and tin plate mill include a continuous pickling line; a 5-stand, tandem, 4-high cold reduction mill; 2 electrolytic cleaning lines; 10 rectangular annealing furnaces which can be moved by overhead crane to 30 different bases; 2 two-stand, tandem, 4-high temper mills; a single-stand, 4-high sheet temper mill; and modern side-trimming and shearing lines.

Tin plate is produced by hot-dip tinning for which there are 14 independent lines with mechanical assorting, reckoning and piling lines; and electrolytic tinning on a continuous plating line which includes mechanical assorting, reckoning and piling facilities. There is also a sheet galvanizing line.

FTC States Policy on Pricing Methods

Holds f.o.b. mill pricing less suspect of possible law violation than other geographic pricing practices. Emphasizes other methods not inherently illegal

F.O.B. MILL PRICING is the only method, in the opinion of the Federal Trade Commission, that is not suspect of possible violations of the Clayton Act, as amended, and the Federal Trade Commission Act.

Single or multiple basing point systems, freight equalization, uniform delivered prices, and zone pricing systems are open to question. While these geographical pricing practices are not illegal in themselves, the FTC believes they may be used to eliminate price competition (price fixing) or to effect price discriminations to injure or prevent competition.

These are some of the conclusions contained in a 4500-word memorandum on its policy toward geographic pricing practices. The FTC said the statement was written to clear up confusion over the effects of recent court decisions and FTC policy on pricing practices.

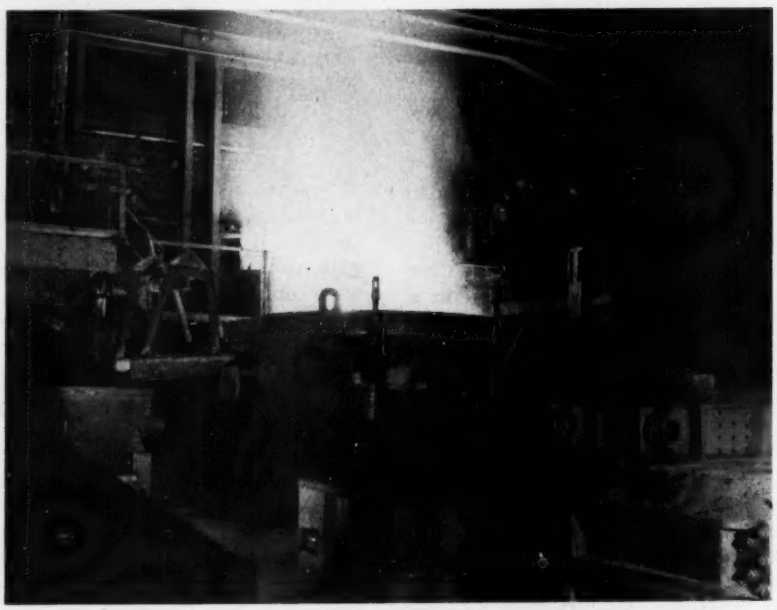
Represents Majority Opinion—The policy statement represents the opinion of four of the five commissioners, with Lowell B. Mason, who has been critical of his colleagues' stand, dissenting.

The majority opinion is construed in some quarters as an answer to the criticism of Sen. Homer E. Capehart that the commissioners and the staff members all hold more or less divergent views as to enforcement of the Clayton and the FTC acts.

May Violate Both Laws—Questions about pricing systems may arise under either the FTC Act or the Clayton Act or both. The question raised under the FTC Act is that of price fixing. Under the Clayton Act, as amended by the Robinson-Patman Act, the question likely will be one of price discriminations which injure or prevent price competition.

The FTC statement stresses that the geographic pricing practices are not illegal in themselves, but become unlawful by virtue of the unlawful uses to which they are put.

"It is conceivable that any geographic pricing system may be a part of a conspiracy to eliminate competition. The question whether or not geographic pricing practices are used for these purposes is one of fact in particular cases. It does not differ in character from the question wheth-



CONVERSION STEEL: Four thousand tons of ingot will be produced monthly in this basic open hearth, converted from an acid furnace, at United Engineering & Foundry Co.'s New Castle, Pa., plant. Pictured is the pouring of the first heat from the converted furnace. Steel goes to another manufacturer, who will have it processed into flat-rolled products

er any other device—price filing, the dissemination of price statistics or the holding of periodic meetings of sales managers—is used for a similar purpose."

Nevertheless, the FTC says, there are differences in the degree of probability of the various geographic pricing methods being used for collusive purposes. The f.o.b. mill pricing without freight equalization, it says, is above suspicion.

Sees Steel Decentralizing

CONSEQUENCES of the Supreme Court's basing point decision are viewed as a matter of concern by national defense planners, Arthur M. Hill, chairman, National Security Resources Board, has informed Sen. Alexander Wiley.

Mr. Hill believes these consequences will be in three stages—immediate, short-term and long-term. Effects of each, said the NSRB head, are likely to be:

1. The basing point action will have little immediate effect on the location of industry.

2. After enough time has elapsed for the new pricing methods to have a tangible influence on plant location, the effect probably will be to cause some plants using steel to locate closer to steel supply sources. The movement, however, probably will not be general.

3. For the long pull, areas which are large users of steel obtained from other sections may expand their steelmaking capacity.

Urges Corrective Legislation

CONTENDING that the outlawing of the multiple basing point pricing system and the adoption of mill pricing is stifling to industrial progress, E. D. Giberson & Co., Maspeth, Long Island, N. Y., is urging its customers to write senators and congressmen asking for corrective legislation. The disruption in pricing, the company asserts, "is economically unsound and will breed hardships and dislocations in American industry."

Clark Named OIC Head

EARL W. CLARK has been appointed director of the Office of Industry Cooperation. He has been serving as acting director since John C. Virden's resignation from that position to return to private business last Sept. 1.

Mr. Clark was formerly national liquidation officer of the Office of Temporary Controls. Later he served as director of the Division of Liquidation in the Department of Commerce, charged with the responsibility of liquidating a number of the wartime government agencies.

STEEL DISTRIBUTION—FIRST HALF OF YEAR

(All grades including alloy and stainless)

Market Classification	1948 Net Tons	1948 Per Cent of Total	1947 Net Tons	1947 Per Cent of Total
Converting and Processing	2,756,115	8.53	2,694,580	8.65
Jobbers, Dealers, and Distributors	5,538,121	17.13	5,235,554	16.81
Construction and Maintenance	3,512,036	10.86	3,035,337	9.75
Contractors' Products	1,184,126	3.66	1,128,253	3.62
Automotive	4,927,094	15.24	4,358,626	13.99
Rail Transportation	2,534,752	7.84	2,470,482	7.93
Shipbuilding, Marine Equipment	269,324	0.83	163,701	0.53
Aircraft	15,923	0.05	14,818	0.05
Oil and Gas Drilling	333,448	1.03	439,463	1.41
Mining, Quarrying and Lumbering	158,321	0.49	139,465	0.45
Agricultural	746,925	2.31	610,621	1.96
Machinery, Industrial Equip., Tools	1,487,170	4.60	1,637,010	5.25
Electric Machinery and Equipment	793,821	2.46	798,773	2.56
Appliances, Utensils and Cutlery	973,348	3.01	774,661	2.49
Other Domestic and Com. Equip.	874,219	2.70	845,452	2.71
Containers	2,537,270	7.85	2,459,085	7.89
Ordnance and Other Military	13,985	0.04	15,130	0.05
Export	1,751,810	5.42	2,086,260	6.70
Unclassified	1,921,588	5.95	2,241,325	7.20
Totals	32,329,396	100.00	31,148,596	100.00

More Steel Delivered

Automobiles get 50 per cent of total increase in shipments over a year ago

NEARLY HALF of the million-ton increase in steel shipped by mills in the first half of 1948 went to the automotive industry. Next two classifications in tonnage increases are the construction industry and jobbers, dealers and distributors.

Figures released by the American Iron & Steel Institute show steel shipments in the first half of 1948 total 32,329,396 net tons, a 1,180,800-ton increase over the corresponding period of 1947.

In the first half of 1948, the automotive industry received directly from the mills 4,927,094 net tons, an increase of 568,468 tons over the 4,358,626 tons it was given in the first half of 1947. The 1948 receipts were 15.24 per cent of the total mill shipments; in the first half of 1947 receipts represented 13.99 per cent. In addition, an undetermined tonnage went to the automotive industry via jobbers, dealers and distributors.

More For Construction—Mill shipments to the construction industry, including maintenance, during the first half of 1948 totaled 3,512,036 tons, a rise of 476,699 tons over the 3,035,337 tons received in the first half of 1947. The construction industry's share in the first half of 1948 was 10.86 per cent of all mill shipments. In the corresponding period of last year it was 9.75 per cent.

Most of the increase went to the oil and gas industry, its direct mill shipments amounting to 989,359 tons in the first half of 1948, a rise of 460,435 tons over the 528,924 tons it received in the corresponding period of 1947. Of the 989,359 tons taken in the first half of 1948, line pipe accounted for 518,159 tons.

Increase to jobbers, dealers and distributors was 302,567 tons, their receipts in the first half of 1948 being 5,538,121 tons, or 17.13 per cent of all mill shipments, compared with 5,235,554 tons, or 16.81 per cent in the first half of 1947.

Smaller Exports—Ten other groups also received tonnage increases. Helping make increases possible were decreases to six groups. Largest decrease was in exports, that classification getting 1,751,810 tons in the first half of 1948, compared with 2,086,260 tons in the like period of last year. The 1948 exports amount to 5.42 per cent of all mill shipments, compared with 6.70 per cent in the first half of 1947.

Other five groups in which there were decreases are oil and gas drilling; machinery, industrial equipment and tools; electrical machinery and equipment; ordnance and other military; and unclassified.

In alloy steel distribution, the automotive industry fared better in the first half of 1948 than in the first half of 1947. Of mill shipments of 2,263,393 net tons in the first six months of 1948, the automotive classification received 768,738 tons, or 33.96 per cent. During the first half of 1947 the automotive group got 551,616 tons, or 26.40 per cent of total mill shipments of 2,089,371 tons.

Stainless Steel—The automotive industry and the appliances, utensils and cutlery classification were the two biggest consumers of stainless

steel in the first half of 1948, as well as in the corresponding period of 1947. Of total mill shipments of 156,447 tons of stainless in the first six months of 1948, automotive received 23,572 tons and appliances, utensils and cutlery got 22,307 tons. In the 1947 first half, mill shipments aggregated 158,326 tons, with automotive taking 17,159 tons and appliances, utensils and cutlery, 14,312 tons.

West Expects Higher Prices

WEST Coast manufacturers are bracing themselves for a new storm of production and cost problems.

Many producers of durable goods believe a further increase in steel prices threatens, although recent action of some eastern steel mills in raising extras on alloy steel products hasn't as yet spread to the West Coast.

New Wage Demands—In addition, there's a preponderant opinion that organized labor in many lines will launch demands for a new round of wage increases this winter or next spring.

The West Coast at present is plagued with three serious strikes—those of longshoremen, oil workers and boilermakers.

One other factor disturbing western businessmen is the prospect of further increases in freight rates.

Rail Rate Hike Refused

PETITION of eastern railroads for an increase in freight rates on less than carload lots was turned down last week by the Interstate Commerce Commission. The proposed increase would have averaged 10 per cent on movement of small quantity shipments for more than 50 miles.

Sees 1949 Steel Shortage

Speaker at meeting of sheet metal distributors predicts stringency will be worse next year

AS STRINGENT as supply is this year, 1949 will see even less steel available for free unrestricted distribution. Current demands will continue strong and requirements for the Marshall Plan and the armament program will add greatly to the pressure on the steel mills. Hence, no relief is in sight for the average steel consumer in the foreseeable future despite new peacetime production records.

This forecast was made by Norman W. Foy, general manager of sales, Republic Steel Corp., Cleveland, speaking at the 38th annual meeting of the National Association of Sheet Metal Distributors, a convention held concurrently with those of the National Wholesale Hardware Association and the American Hardware Manufacturers Association at the Marlborough-Blenheim Hotel, Atlantic City, Oct. 18-21.

Finds No Weakness—Mr. Foy said he had been watching for some sign that the hard goods industries were catching up with demand but as each was analyzed no evidence of fundamental weakness could be found. He described pipe demands of the petroleum industry as fantastic.

Except for purely military needs essential to adequate preparedness, he felt allocation powers, voluntary or otherwise, should be terminated.

Referring to appeals of some industries for steel priorities based on the contention their needs were essential to national preparedness, he pointed out that various end-uses of their products could not be described as being of the highest national importance, and that properly, therefore, in granting preferences to these industries there would have to be a regulation of end-uses which would not be desirable in peacetime. He mentioned oil, for instance, stating that while it is recognized there is urgent need for petroleum and petroleum products, it could hardly be contended that all production of the oil industry is used only for highly essential purposes.

Get Less Steel—Thomas A. Fernley Jr., executive secretary of the association, reported to the convention that business of members in point of dollar value is well up from 1940 but that many distributors, at least in some important lines, are not getting as much tonnage as they did prewar.

John P. Speck, Tiffin Art Metal Co., Tiffin, O., was re-elected president, and Ray P. Farrington, Potts-Farrington Co., Philadelphia, a vice president. Alexander Thomson, Tanner Co. Inc., Indianapolis, was named to a vice presidency, succeeding P. M. McKenney, Conklin Tin Plate & Metal Co., Atlanta. Thomas A. Fernley Jr. and Robert C. Fernley, Philadelphia, were re-elected executive secretary and secretary, respectively.

At a joint meeting of the hardware manufacturers and wholesalers, Lowell B. Mason, member of the Federal Trade Commission, urged that Congress be pressed for relief from restrictions placed on trade practices by recent court decisions. He referred particularly to the restrictions of what he called the "5C" cases, cement, conduit, crepe paper, corn and calt (salt). Most manufacturers and distributors, he said, think first and primarily of the cement case in connection with their present marketing troubles but he warned they should consider them all in their drive on Congress for really effective relief.

WAREHOUSEMEN MEET: Steel distributors and mill representatives attend a joint meeting of the Southern, Kansas City, St. Louis, Colorado and Texas chapters of the American Steel Warehouse Association in Houston, Oct. 7-9. Principal speakers were Walter S. Doxsey, president of the ASWA, and Norman W. Foy, manager of sales, Republic Steel Corp., Cleveland

Wire Meeting Well Attended

TWO PLANT visitations were made by members and guests of the Wire Association during its annual meeting at the William Penn Hotel, Pittsburgh, Oct. 18-22, one at the wire mill of the Jones & Laughlin Steel Corp., Aliquippa, Pa., and the other at the Westinghouse Electric Corp., East Pittsburgh, Pa.

Over 400 were registered at the meeting. Next year's convention will be held at Hotel LaSalle, Chicago, Oct. 17-21.

At the close of the association's luncheon, Wednesday afternoon, Col. Malcolm Hay, Infantry-Reserve

U.S.A., spoke on the "National Security and the Draft." The Mordica Memorial Lecture was presented by C. L. McGowan, superintendent, Wire Mill, Atlantic Steel Co., Atlanta.

More Iron for Foundries

Speaker at Gray Iron Founders' meeting most optimistic on supply outlook since war's end

FOUNDRYMEN who have been wrestling with an acute pig iron shortage for months past were given a little encouragement last week that supply conditions may be slightly better from now on.

Speaking at the recent 20th annual meeting of the Gray Iron Founders' Society, John A. Claussen, secretary, Merchant Pig Iron Committee, American Iron & Steel Institute, said that while continued heavy demand for steel will prevent any large increase in the amount of iron available to foundries, still he was more optimistic concerning the outlook than at any time since the end of the war.

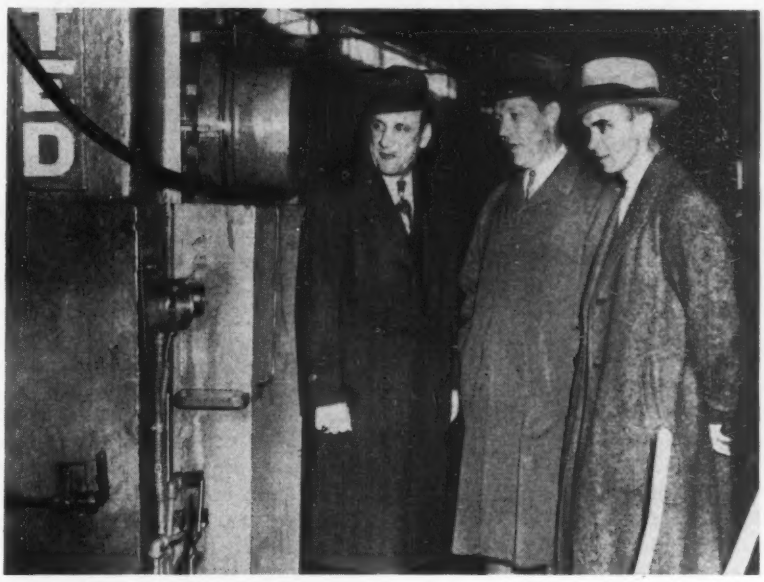
Pointing out that repairs to blast furnaces have been relatively heavy this year, the shutdowns resulting in decreased iron shipments, he said with most stacks expected to be in full production by the end of the year, better operations are in prospect.

Ore and coke supplies appear adequate through the winter, and the rising trend of pig iron imports—recently at 13,000 to 15,000 tons monthly—contributes somewhat to the improved outlook.

Discuss Problems—Program of the society's meeting, held at Atlantic City, Oct. 14-15, also included a session devoted to reports of officers and committee chairmen, a symposium on foundry hygiene, and discussion of foundry personnel training and profit-sharing plans.

Hermann P. Good, foundry superintendent, Textile Machine Works, Reading, Pa., was elected president of the society, succeeding Howard A. Stockwell, treasurer, Barbour Stockwell Co., Cambridge, Mass. Other officers elected are: Vice president, John E. McIntyre, vice president and general manager, Sibley Machine & Foundry Corp., South Bend, Ind.; secretary, Robert G. Schaefer, chairman and treasurer, Schaefer-Goodnow Foundries Inc., Pittsburgh; treasurer, Henry J. Trenkamp, president, Ohio Foundry Co., Cleveland.

New directors are H. L. Edinger, president, Barnett Foundry & Machine Co., Irvinton, N. J.; J. W. Simmons Jr., secretary-treasurer, Cox Foundry & Machine Co., Atlanta; E. B. Sherwin, president, Chicago Hardware Foundry Co., Chicago; C. F. Scherer, president, Davenport Machine & Foundry Co., Davenport, Iowa; H. D. Caylor, president, C. & G. Potts & Co., Indianapolis; A. E. Thomas, president, Thomas Foundries Inc., Birmingham, and S. D. Russell, president, Phoenix Iron Works, Oakland, Calif.



FIFTIETH ANNIVERSARY: Some of the hosts at the open house celebration of Allegheny Ludlum's West Leechburg, Pa., plant were John Wertemann, manager of rolling, M. J. Graham, plant manager, and Clark W. King, vice president, who are seen inspecting a single stand reversing 4-high mill used for either intermediate or final cold reduction of stainless and special alloy strip

HERMANN P. GOOD

Hageboeck, Honored—The society honored Arthur E. Hageboeck, executive vice president, Frank Foundries Corp., Moline, Ill., presenting to him its first recently established gold medal award for outstanding service.

Illuminated scrolls were presented to four other individuals in recognition of meritorious service. Recipients were: John M. Price, president, Ferro Machine & Foundry Co., Cleveland; Philip Frankel, secretary-treasurer, Superior Foundry Inc., Cleveland; Arthur J. Tuscany, executive secretary, Foundry Equipment Manufacturers Association, Cleveland, and Howard A. Stockwell, treasurer, Barbour Stockwell Co., Cambridge, Mass.

Observes 50th Anniversary

OPEN house to observe the 50th anniversary of the West Leechburg, Pa., plant of Allegheny Ludlum Steel Corp. was held Oct. 19-20. More than 10,000 people visited the unit.

Visitors saw the fifteen tandem mill which the company believes was the first rolling mill ever built to use modern rolling practices.

Many "firsts" in the steel industry are claimed by Allegheny Ludlum. The West Leechburg plant was the first to roll steel into strip; in 1901 a 12-inch hot mill was turning out the widest, thinnest steel strips made up to that time; in 1906 it was the first to apply tension to the cold rolling of strip.

Tool Builders Warned of Job Ahead

Must build 100,000 units in year if United States goes to war. Industry advised of selling American system to the rest of the world

SHOULD the United States go to war, the machine tool industry would be expected to produce 100,000 new machine tools within 12 months after the beginning of hostilities. This goal of the National Security Resources Board would pose terrific problems to the industry, as at least six months would be required to expand personnel and facilities to reach the necessary production rate.

This possibility was tossed to machine tool builders at the 47th annual meeting at Chalfonte-Haddon Hall, Atlantic City, N. J., last week by A. G. Bryant, retiring president of the NMTBA.

Mr. Bryant expressed confidence that the industry would do what was necessary to do, as it has done in the past. He said the industry wants no subsidy, such as some other industries get but that machine tool builders did want to be free of interference and obstructions.

Sen. Ralph E. Flanders (Rep., Vt.), who served as president of NMTBA 25 years ago, said that in meeting the "international competition" as represented by communism, we must recognize that this is no collection of loose ideas but rather a body of philosophy as represented by our own industrial and economic system and our own way of life.

"Make It Work"—To disarm those who attack our system, Senator Flanders urged that the good old mechanics' rule, "Make the thing work", should constantly be followed by our industrialists and by those in public life.

In the same vein, Jerome A. Raterman, president, Monarch Machine Tool Co., Sidney O., said:

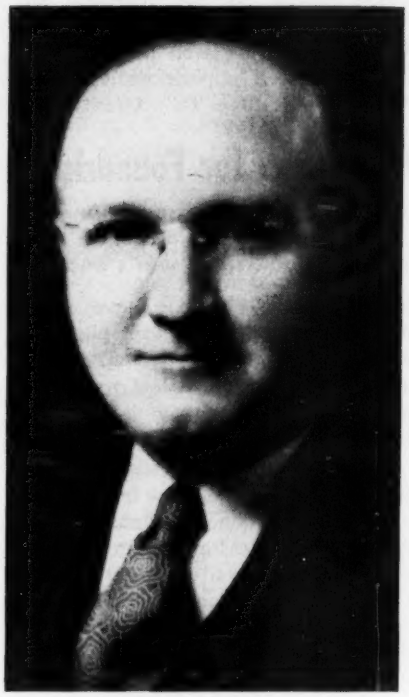
"The United States of necessity has assumed a position of world leadership and has taken a stand on behalf of the free enterprise system. And yet, at the very time when we are trying to convince the rest of the world that ours is the best philosophy, large numbers of people right here at home express serious doubts as to its basic premises and end results from the standpoint of public good.

"In other words the product we are trying to sell is under fire not only from our 'competitors' but also from our 'customers'.

Selling Job—"Under such circumstances a machine tool builder would do three things: (1) Find out just what his competitors were saying about his machine—and then discount those statements heavily because they are competitors. (2) He would find out what his customers were saying—and if they had some real complaints he would do some real worrying about them. (3) He would immediately make further study of his product to discover whether his customers' complaints were justified to the extent of giving aid and comfort to his competitors.

"I say that American industry as a whole must tackle this job of selling the American free enterprise system just as if it were a product put out in the face of competition, opposition and misunderstanding on the part of its customers."

In his valedictory address as retiring president of the association, Mr. Bryant said:



LLOYD D. MCDONALD

"The five main avenues along which this association must proceed are: (1) Engineering development, calculated to maintain supremacy; (2) national defense, represented by unstinting advisory assistance to the armed forces to keep our facilities for production of defense materiel in condition of maximum usefulness and dependability; (3) effective selling of machine tools as 'the world's best investment'; (4) fiscal policies, including advocacy of sound policies of taxation, repricing and amortization; and (5) export markets, stimulated through a revised foreign policy which will support ECA through more definite direction as to use of loans and grants under the Marshall Plan."

This last statement was backed up by M. A. Hollengreen, president, Landis Tool Co., Waynesboro, Pa., who, like Mr. Bryant, has just returned

DAVID AYR

RICHARD E. LEBLOND

LOUIS F. POLK

from an extensive European trip. Mr. Hollengreen made special mention of the vigorous industrial recovery of Italy as contrasted to the apathy of France.

Other featured speakers included John E. Lovely, vice president, Jones & Lamson Machine Co., Springfield, Vt., on "Trends in Machine Tool Design," with emphasis on improved work loading and unloading; J. Robinson, assistant chief engineer, Vickers Inc., Detroit, on "Hydraulics for Machine Tools," with emphasis on design for safety; W. B. Wigton, electrical engineer, Cincinnati Planer Co., with emphasis on unification of electrical standardization between the machine tool and automotive industries; J. Edward Goss, industrial activities administrator, Brown & Sharpe Mfg. Co., Providence, R. I., who urged setting up of minimum requirements for diplomas—preferably 8000 hours of varied training; and Daniel R. Weedon, assistant manager, Blanchard Machine Co., Cambridge, Mass., who as "dean" of the Sales Refresher Course at Cornell University last July, came forward to announce that on the basis of the success of that project similar courses will be given in 1949 at Dartmouth College, Western Reserve University and Purdue University, as well at at Cornell.

New officers—Elected to serve during 1948-49, were the following officers: President, Lloyd D. McDonald, vice president, Warner & Swasey Co., Cleveland; 1st vice president, David Ayr, president, Hendy Machine Co., Torrington, Conn.; 2nd vice president, Richard E. LeBlond, president, R. K. LeBlond Machine Tool Co., Cincinnati; treasurer (re-elected), Louis Polk, president, Sheffield Corp., Dayton, O.

New directors are Ralph J. Kraut, president and general manager, Giddings & Lewis Machine Tool Co., Fond du Lac, Wis.; Alfred V. Bodine, president and treasurer, Bodine Corp., Bridgeport, Conn. Tell Berna was reappointed as general manager of the association, and Mrs. Frida F. Selbert as secretary.

Explains Preparedness Surveys

EXTENSIVE industrial surveys of the nation's plant and equipment with a view to placing pool or standby orders similar to those registered with the machine tool industry were explained by Frank M. Shields, deputy director of production, National Security Resources Board, to members of the National Metal Trades Association meeting at New York, Oct. 18-20.

Among metalworking industries covered are gages, cutting tools, abrasives, mechanical and hydraulic presses and hammers, materials handling equipment, industrial furnaces and ovens, foundry equipment and production and anti-friction bearing industry.

Make Surveys—While phantom orders may be placed with some of these, surveys will bring out any weaknesses and permit their correction before an emergency which might result in sudden demand on their facilities, Mr. Shields said. A task force for each industry covering 30 divisions is being organized covering activities largely directed by the War Production Board during the war.

Awarding of phantom tool orders for 100,000 general purpose machines valued at $750 million to 300 machine tool builders is but the first step in the program to key all industry for an emergency and surveys conducted among other metalworking plants will follow much the same direction as in machine tools.

Labor Laws Discussed—The 3-day conference of the association was devoted largely to study of labor relations and laws, including recent developments under the wage-hour law.

T. J. Morton Jr., Hoosier Cardinal Corp., Evansville, Ind., was elected president of the association succeeding Howard Goodman, Goodman Mfg. Co., Chicago. J. L. Kopf, of Jabez Burns & Sons Inc., New York, was elected first vice president, and Phillip Morgan, Morgan Construction Co., Worcester, Mass., second vice president and treasurer.

Need Fair Specifications

SPEAKING at opening luncheon day session of the national conference and product exhibit of National Institute of Government Purchasing in Philadelphia on Oct. 18, Vice Admiral George F. Hussey Jr. (USN retired), secretary, American Standards Association, New York, made a strong plea for making government contracts a "fair business deal."

Admiral Hussey, wartime director of production in Navy Bureau of Ordnance, stated that when a supplier has complied with his contract, he must be in a position to come back again if there be a recurring need for his product. He cited a need for government buyers encouraging the technical staffs of suppliers in utilizing existing standards that fill the bill rather than in expending their time in developing specifications which may be more expensive and difficult to fill without offering any advantages over those on hand.

Calendar of Meetings . . .

Oct. 25-27, American Gear Manufacturers Association: Fall meeting, Edgewater Beach Hotel, Chicago. Association headquarters are in the Empire Bldg., Pittsburgh.

Oct. 25-29, American Society for Metals: 30th annual meeting, congress and exposition at Commercial Museum and Convention Halls, Philadelphia. Society headquarters are at 7301 Euclid Ave., Cleveland. The following associations will hold technical meetings in conjunction with the congress: **American Welding Society, Institute of Metals Division of American Institute of Mining & Metallurgical Engineers and Society for Non-Destructive Testing.**

Oct. 26-27, American Management Association: Annual meeting of Office Management Division, at Hotel Pennsylvania, New York. Association headquarters are at 330 W. 42nd St., New York.

Oct. 26-28, Purchasing Agents Association of Baltimore: Eighth annual manufacturers' products exhibit, at Lord Baltimore Hotel.

Oct. 27, American Iron & Steel Institute: Regional technical meeting, Hotel Thomas Jefferson, Birmingham.

Oct. 28-29, Porcelain Enamel Institute: 17th annual meeting and sales and management conference, Hotel Stevens, Chicago.

Nov. 3-5, American Institute of Electrical Engineers: Southern district meeting, Birmingham. Institute headquarters are at 33 W. 39th St., New York.

Nov. 3-5, American Society of Body Engineers Inc.: Annual convention, Rackham Memorial Bldg., Detroit. Society headquarters are at 100 Farnsworth Ave., Detroit.

Nov. 3-5, Industrial Management Society: Twelfth annual national time and motion study clinic, at Sheraton Hotel, Chicago. Society headquarters are in the Midland Bldg., Chicago.

Nov. 4-5, Society of Automotive Engineers: Fuels and lubricants, The Mayo, Tulsa, Okla. Society headquarters are at 29 W. 39th St., New York.

Nov. 4-5, American Society for Quality Control and Chicago Association of Commerce: Third midwest quality control conference, Sherman Hotel, Chicago. Society headquarters are at 4949 W. 65th St., Chicago.

Nov. 5, Illinois Mining Institute: 56th annual meeting, Hotel Abraham Lincoln, Springfield, Ill. Institute secretary-treasurer is B. E. Schonthal, 28 E. Jackson Blvd., Chicago.

Nov. 5, American Iron & Steel Institute: Regional technical meeting, Mark Hopkins Hotel, San Francisco

Nov. 5-6, Machinery Dealers' National Association: Machine tool conference, sponsored jointly by the association and Wharton School of Finance & Commerce, University of Pennsylvania; to be held in Philadelphia. Association headquarters are at 20 N. Wacker Dr., Chicago.

Nov. 8-9, Materials Handling Conference: 2nd annual meeting, sponsored by Westinghouse Electric Corp., at Hotel Statler, Buffalo.

Nov. 12, Pittsburgh Section of Open Hearth Committee, Iron & Steel Division, and Pittsburgh Section, AIME: Annual fall meeting, William Penn Hotel, Pittsburgh.

Nov. 14-17, National Tool & Die Manufacturers Association: Annual meeting, Hotel Schroeder, Milwaukee. Association headquarters are at 1412 Union Commerce Bldg., Cleveland.

Nov. 17-18, American Zinc Institute: Meeting of the Galvanizers Committee, Roosevelt Hotel, Pittsburgh.

Nov. 18-19, National Founders Association, Annual meeting, Sheraton Hotel, Chicago. Association executive vice president is L. E. Roark, 120 S. La Salle St., Chicago.

Windows of Washington

By E. C. KREUTZBERG — *Washington Editor, STEEL*

Washington marking time, awaiting new bosses. Department heads believe it futile to plan new programs now, with change in administration probable within three months

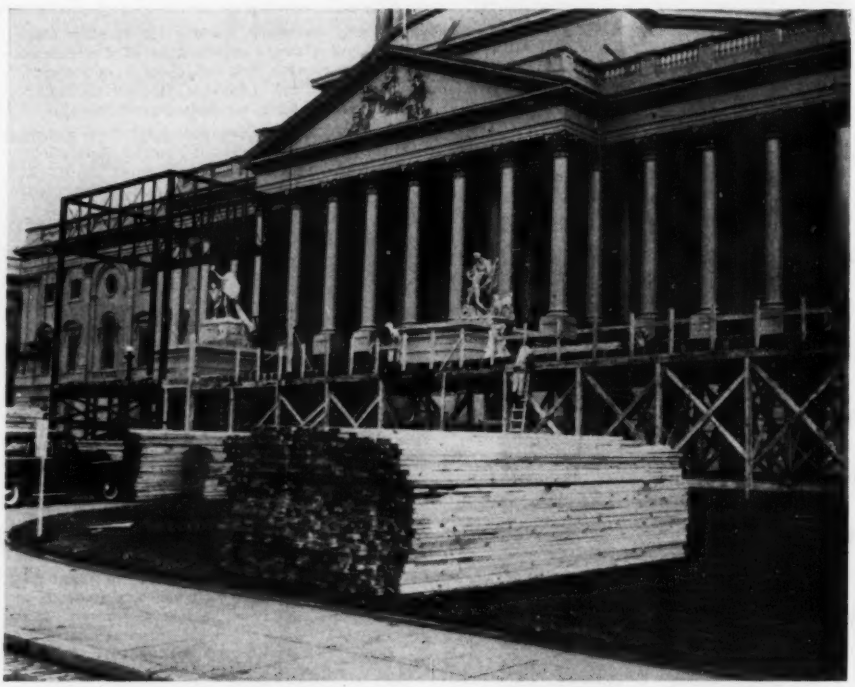
NOT in many years has normal governmental activity in Washington been so much discouraged by election prospects. For the first time since 1932, government officials expect a change in party control. If that happens, there will be a new cabinet and the great majority of government entities will have new bosses, or at least new policy directives. So, except for carrying out definite assignments from the President or Congess, ask government administrators, what is the sense in trying to get new things started now? Better to wait, they think, until results of the election become known, and new policies begin to be decided at the White House after what is expected to be Governor Dewey's inauguration on Jan. 20.

Adding to the depth of the stalemate in planning activities, government officials have not learned much about Governor Dewey's program from his speeches, in which he has stressed the need for unity and "good government," and in which he has refrained from getting into specifics. So they do not know what is wanted; aside from carrying out regular tasks and special assignments already given, the huge federal machine is largely stalled. Many in the capital think something ought to be done about this, pointing out that in these days of touch and go at Paris and Berlin there should be a firm hand at the nation's throttle.

No Resources Study—As an example of important work that is not being done, there is no full-scale study under way as to our total national resources in relation to needs that might develop suddenly in an emergency; the approach on such a balance-sheet still is of a piecemeal character. Here is a gigantic task requiring full co-operation of the Commerce, Interior, Agriculture and other departments and of the National Security Resources Board and Munitions Board. If Dewey is elected as expected, all will have new heads who will work in accordance with policies enunciated at the White House or enacted by Congress. This goes also for the National Security Resources Board which, aside from its civilian chairman, is composed entirely of cabinet officers. So the determination of a balance-sheet of resources and deficits, in relation to specific needs to be expected in a condition of emergency or limited emergency must wait.

The situation surrounding the problem of scarce materials is beclouded with this same uncertainty and hesitancy. When President Truman called for mandatory controls, it will be recalled, the interested departments were instructed to back up his demand, and this they did in their appearances before congressional committees. Today there is no mature administration program; there are only personal opinions which lack authority. Hence it is impossible to develop anything worthwhile from government officials on a question so vital to the country's industrialists as: What will happen with reference to steel distribution after Feb. 28 if Congress refuses to extend the voluntary allocations agreements program?

Controls Threatened—Congressional advisers say that congressmen all over the country have been deluged with complaints from consumers who cannot get enough steel, who have been cut off from their normal sources because of the new mill policy of catering to nearby consumers, and who have to pay higher freight rates on steel due to the new f.o.b. mill prices quoted by the steel producers. Congressional advisers say the "fur is going to fly" when Congress convenes Jan. 3, and they say that mandatory controls over steel distribution have better than a 50-50 chance of adoption. On the other hand, Congress has a record of unexpected vagaries, and the steel industry and its customers will have to live in the fog on this important matter until Congress acts.



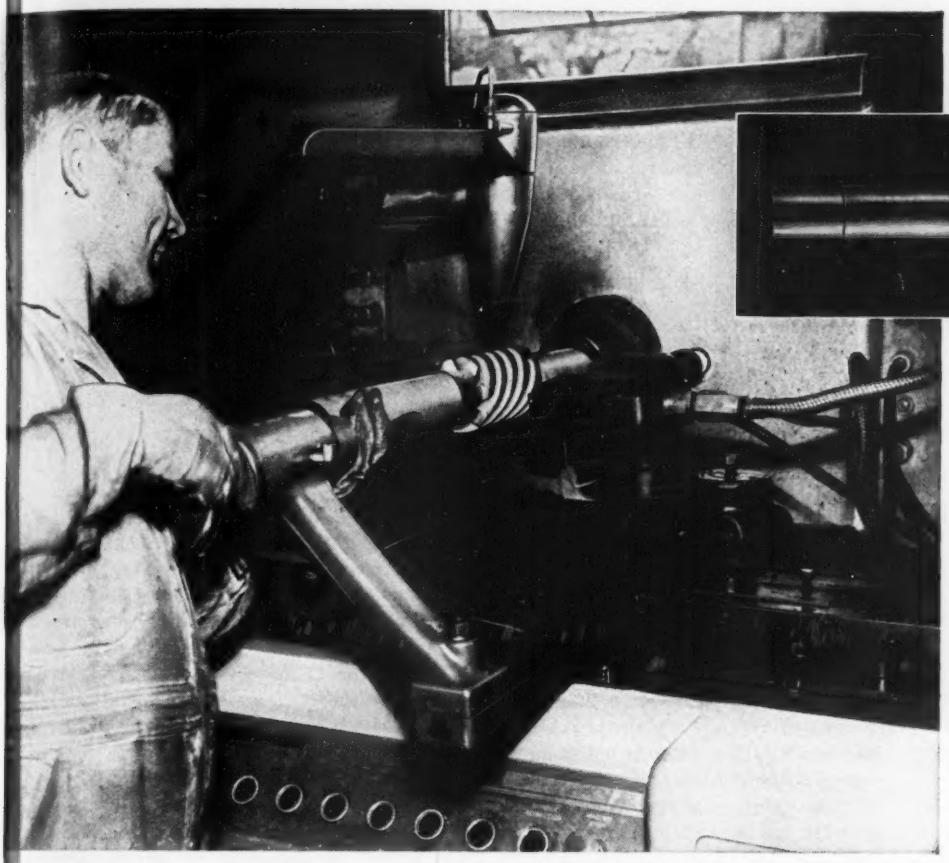
Stands for the presidential inauguration ceremonies next Jan. 20 are being readied by carpenters at the national capital. Anticipation of a change in administration has slowed government functioning to a walk. NEA photo

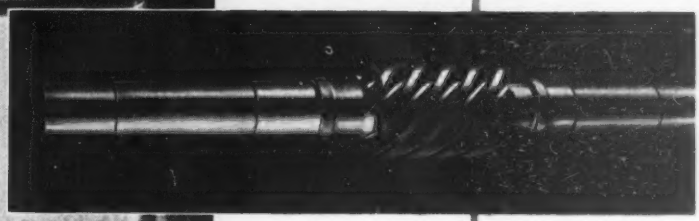
Helps Small Business

ONE popular government agency is the Small Business Division in the Reconstruction Finance Corp. Since this unit was set up in June, 1946, it has received requests for assistance from some 400,000 concerns.

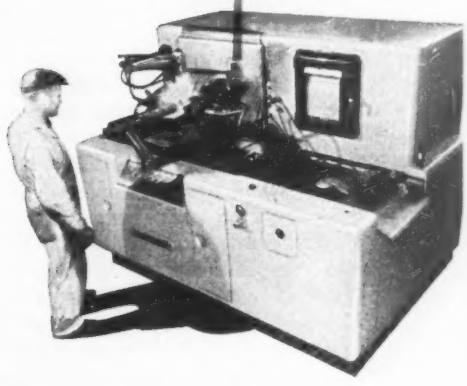
The term "small business," incidentally, is defined by the Small Business Division very broadly. Of the approximately 3,500,000 business firms in the United States, some 98 per cent employ 60 per cent of the work-

1 operation instead of 3





part:	worm shaft
length:	27½"
O. D. at worm:	2½"
material:	SAE 4615 carburized .04(
hardening time:	40 seconds
surface hardness:	58 to 61 Rc
depth of hardness:	.046"
operation:	harden worm section



Flamatic selective surface hardening eliminated a lot of troublesome work

for Accurate Steel Treating Co., Chicago, Ill. Prior to the use of Flamatic Hardening, their worm shafts were case carburized, the case then machined off several diameters, then furnace hardened . . . and finally shaft ends annealed, prior to machining threads and keyways. This required wasteful shuttling of the work pieces between the part manufacturer's plant and Accurate Steel Treating Co.

Flamatic hardening eliminated two operations, and made everybody happy with a better product at lower unit cost. Here's how: after carburizing to a depth of .046", the threaded section of the shaft was Flamatic hardened to 60 R_C. Hardening time: 40 seconds. Distortion: well under .002". Rejections: none.

Flamatic's exclusive electronic temperature control stops flames within plus or minus 5°F of desired preset value, at which point the operator removes shaft and places it in the oil quench. (Parts within Flamatic size capacity do not require manual unloading, but are automatically stripped off work arbor and deposited in the quench tank in the Flamatic machine.)

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THE CINCINNATI MILLING MACHINE CO., CINCINNATI 9, OHIO, U.S.A.

ers and are regarded as "small business." The other 2 per cent, which employ 40 per cent of the workers, are "big business." Thus 98 per cent of business firms are eligible for assistance by this division.

Head of the division is a life-long banker and investment expert, Chauncey Y. Dodds. He told STEEL that less than 25 per cent of the applications for assistance are for loans. The great majority of the firms that seek help at RFC's regional offices and at its Washington headquarters need engineering or management advice in connection with their production, sales, accounting and other problems.

Use Private Firms—"We listen to their problems, diagnose their trouble and send them to competent private firms who can give them the necessary help," said Mr. Dodds. "We tell them when we think they should employ counsel to handle some matters. We help them prepare applications for bank loans, and we loan in many cases after the banks have refused them. We made some 14,000 small business loans from July 1, 1946, through 1947—either wholly by RFC or in participation with banks. In many cases we showed firms how to change their methods so as to make it unnecessary for them to borrow money."

The Small Business Division uses its own engineers, or employs outside firms, only when interested in protecting the RFC position as a lender. For example, in connection with its loans to finance construction of the Kaiser steelworks at Fontana it retained Arthur G. McKee & Co., Cleveland. Its general policy is one of throwing such business to private engineering firms rather than of going into competition with them.

Sound Investment — It costs about $3,000,000 a year, administratively, to run the Small Business Division. Mr. Dodds says that this is a sound investment of taxpayers' money since it keeps many firms from folding up and it helps millions of employees in the aggregate to hold their jobs more securely.

For a description of the activities of the Justice Department's Small Business Unit, the other government agency specially set up to help small business concerns solve their problems, see STEEL, Oct. 11, p. 70.

Capehart Completes Agenda

PLANS now have been completed for the series of hearings to be started Nov. 9 in Washington by Sen. Homer E. Capehart's Senate Trade Policies Committee. According to the committee's general counsel, William Simon, the witnesses will be the Federal Trade commissioners, members of the Federal Trade Commission enforcement staff, and producers and consumers of steel, cement and beet sugar. Five steel producers and 20 steel users will be heard and questioned, with smaller representations from cement and beet sugar. The purpose, as previously stated by Senator Capehart, is to determine what, if anything, Congress should do to improve the Federal Trade Commission and Clayton Acts, and their administration.

This series of hearings will last eight days. Later, in December, further hearings are scheduled, the plan being to get a report written for the 81st Congress for presentation soon after convening on Jan. 3. In the meantime, the committee held another meeting with its advisory council, at the Palmer House, Chicago, Oct. 21 and 22, for a rechecking of its program.

Time Running Out

COMMERCE Secretary Charles Sawyer has abandoned his plan of meeting with trade association executives to discuss their complaint that their disbarment from attendance at meetings of the Commerce Department with its industry advisory committees is unfair to the industries they represent.

Reason for dropping the plan is that the effective period of the voluntary allocations programs under Public Law 395 is drawing to a close—unless Congress should extend the life of the act; it was in the meetings having to do with voluntary allocations programs that the trade association executives were chiefly interested. Another reason, not mentioned, is that unless President Truman is re-elected the Department of Commerce in all probability will have a new secretary effective Jan. 20.

In the meantime, trade association executives continue to receive encouragement in other directions. For example, Chairman Arthur M. Hill of the National Security Resources Board told the Washington Association of Trade Association Executives on Oct. 13 that their co-operation is fully appreciated by his agency; trade association executives are well represented on industry advisory committees of both the NSRB and the Munitions Board.

ECA Capital Goods Requirements

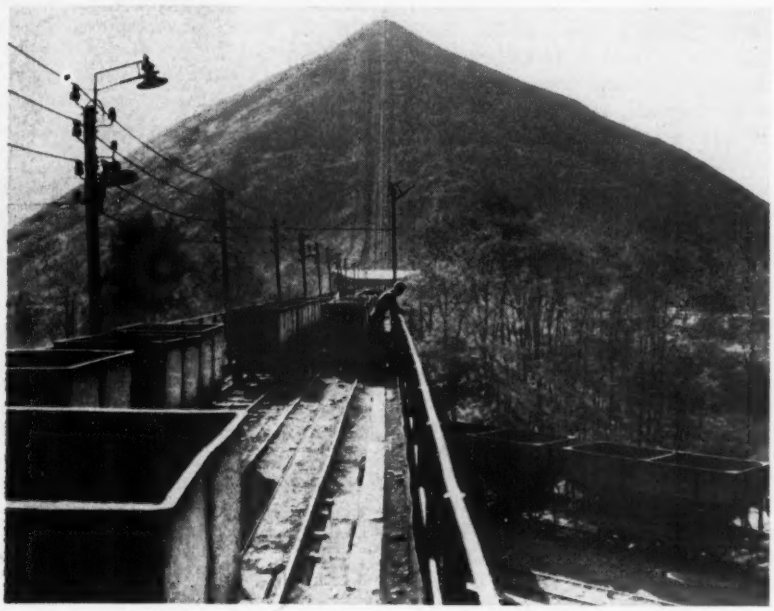
CAPITAL goods and industrial materials requests for the first year of the Marshall Plan's operation (covering the period through June 30, 1949) now have been received from all but two of the participating nations. They are being screened at the Washington headquarters of the Economic Co-operation Administration, with the hope that the final program can be frozen shortly after Nov. 1. Paul G. Hoffman, ECA chairman, is expected to announce details at a press conference Nov. 3 or 4. In the meantime, and until the screening process has been completed, the best information as to the extent of the program is that published in STEEL of Oct. 11, p. 74, which estimated that bookings by capital goods manufacturers in the United States as a result of Marshall Plan authorizations should aggregate somewhere between half a billion and $1 billion for the period ending next June 30.

Banned Exports Secret

GOVERNMENT'S continued ban on publication of the list of goods which, as military potentials, may not be shipped to Russia and Iron Curtain countries, does not have any sympathy in the Commerce Department of which the Office of International Trade is a component. Secretary of Commerce Charles Sawyer, in fact, proposed at a press conference as far back as last August to make this list public. On State Department insistence he called it off at the last minute. The Commerce view is that Russia knows full well what goods she cannot obtain from the United States—so what is the use of denying this important information to United States manufacturers? As things stand now, our manufacturers never know whether they can or cannot deliver goods until the Office of International Trade has approved or disapproved their export license application. This setup puts a crimp in the effort of many machinery and other manufacturers who are trying to develop export business.

Study Science Mobilization

ON THE EVE of his retirement as chairman of the Research & Development Board, National Military Establishment, Dr. Vannevar Bush has appointed a new committee to recommend a program under which the board would best proceed to mobilize our science and development resources in the event of another war. Chairman of the committee is Dr. Irwin Stewart, president, West Virginia University, and a former Federal Communications commissioner. He is the author of "Organizing Scientific Research for War."



FRENCH MINES IDLE: French coal production was halted Oct. 3 when miners walked out in a wage dispute. Mines last week were reported to be suffering from lack of maintenance, and a number were flooded when the Communist-dominated miners union refused to maintain a security force in the pits to man the pumps. NEA photo

Europe Ups Steel Output

Despite international unrest, West Europe boosts iron and steel production

DESPITE international unrest and economic disturbances, western European nations generally are showing steadily improving production records in iron and steel.

Great Britain expects to exceed the original output target for the industry, at 14 million tons, by at least 1 million tons. Currency reform in western Germany has contributed to improved production which is now running about twice the rate during 1947. Belgium, Luxemburg and Italy also are in better position regarding iron and steel, with future prospects bright. Even in France, bedevilled by strikes, the picture has improved with recent settlement of the steel walkout.

Great Britain

STEEL production in September, at the annual rate of 15,435,000 tons, compared with the rate of 14,117,000 tons in August and 13,841,000 tons in September, 1947. Last month's production came within an ace of equaling the 15,444,000-ton rate chalked up last June, highest production ever achieved in British history.

Pig iron production, at an annual rate of 9,407,000 tons in September, compared with 9,048,000 tons in August and 7,805,000 tons a year ago.

Prospects for even better performance in the industry are good, with the newly formed Steel Co. of Wales Ltd. slowly getting into operation. Financial arrangements have largely been completed, and the first load of American machinery for the firm has arrived. The shipment comprises parts for the new cold reduction mill to be erected at Trostre, supplied by United Engineering & Foundry Co., Pittsburgh.

Western Germany

IN SEPTEMBER 571,769 metric tons were produced (not including castings) by Bizonia plants. This is 12 per cent above the August output of 509,878 tons, which in turn was 19 per cent over July production. The July production was 21 per cent over June's. Average monthly 1947 output was 214,000 tons.

In the month 51 furnaces were in operation, highest number since the war. In 1947 an average of 31 furnaces were working each month.

German Administration has submitted its report required under ERP on steel needs from July, 1949, to June, 1952. In this period, it is estimated 11 million tons of steel will be required for maintenance work, 8 million tons for repairs and modernization and 6.5 million tons for public administration and the military government. Of this 25.5 million tons, about 8 million would be required annually. In addition, consumer goods production would require 3.5 million tons annually, and exports, partly contained in finished goods, would also require 3.5 million. Total annual steel requirements would amount to about 15 million tons. The Ruhr is now producing at the annual rate of about 7 million tons.

France

NEW French economic program, which levies higher personal and corporate income taxes, has resulted in a rash of strikes and higher prices. A walkout in steel has been settled, but of equal seriousness is the coal miners' refusal to work.

Token strikes have also occurred in the nationalized gas and electricity industries in protest of the government policy cutting personnel by 10 per cent. Price boosts have increased coal to 3715 francs per ton, an increase of 22.5 per cent; gas by 25 per cent; electricity for domestic consumption by 19.5 per cent; railway freight rates by 30 per cent. The prices of steel and pig iron will soon be increased.

Belgium, Luxemburg

EXPORTS of iron and steel products from Belgium and Luxemburg during August reached 271,385 metric tons. Basing estimates on results for the first eight months of the year, exports for 1948 will exceed 3,200,000 tons, or nearly 1 million tons more than in 1947. Netherlands continues to be the best export market, followed by Argentina. Shipments to Great Britain, at 18,797 tons, were a postwar record.

Two blast furnaces have been blown in at the works of Clabecq and Boel, bringing the number of active furnaces to 47. Belgian production of iron and steel was at a record high in August, with output of ingots and castings totaling 346,000 tons and pig iron 346,600 tons. Finished steel output topped 280,000 tons.

Italy

OUTPUT of iron and steel in Italy has improved since the beginning of the year, thanks to better supplies of electric power and coal. Production during the first half of the year was: 201,500 metric tons of pig iron, compared with 182,000 tons in the first half of 1947; 1,048,300 tons of ingots and castings, compared with 768,000 tons; 799,400 tons of finished steel, compared with 599,000 tons.

K-F Would Take Lease

Offers to operate Gadsden blast furnace if Republic Steel Corp. wishes to abandon it

OFFER to lease the Gadsden, Ala., government-owned surplus blast furnace over which the War Assets Administration and the present lessee and operator, Republic Steel Corp., Cleveland, have had some disagreement has been made by Kaiser-Frazer Corp.

The K-F offer announced by Henry J. Kaiser followed War Assets Administrator Jess Larson's request that Republic make the output of the restored Gadsden furnace available to the foundry industry. The Gadsden stack, which broke down in July, 1947, was placed back into operation in August, 1948.

In making his request Mr. Larson said he was acting in the interests of foundries which Republic reported would be deprived of merchant iron through the recent lease to K-F of a government-owned blast furnace located at Cleveland and now operated by Republic. The lease now has Justice Department approval.

Suggests Co-operative Company— In offering to take over the lease on the Gadsden furnace Mr. Kaiser said he was endeavoring to assure that the iron production of that stack would be supplied to the foundry industry. Commenting that he hoped Republic would agree to WAA's request that Republic supply at least 280,000 tons of pig iron annually from the Gadsden furnace to the foundry industry, Mr. Kaiser said that if Republic chooses to quit operating this plant the foundry industry could establish a co-operative company to lease it. "If the foundry industry forms a co-operative company and is in need of an experienced management group to operate the Gadsden furnace, we will be glad to offer our services on a nonprofit basis," Mr. Kaiser asserted.

However, if Republic does not wish to continue operating the Gadsden stack and if foundries do not wish to form a co-operative to run it, "we," said Mr. Kaiser, "are prepared to lease it on the same terms presented to Republic. It would be our policy during the current foundry pig iron shortage to sell the entire production of Gadsden on the open market to consumers of foundry pig iron."

Gordon P. Street, president of Wheland Co., a Chattanooga, Tenn., foundry, which sued WAA to prevent it from leasing the Cleveland furnace to K-F, has replied that "Mr. Kaiser and Mr. Larson both should know that southern pig iron is not suitable for the general foundry trade because of its high phosphorous content."

Hits at Law Suits — Mr. Kaiser also charged that either by coincidence or plot two firms of attorneys representing Cyrus S. Eaton and his Otis & Co., Cleveland, are now attacking K-F's lease of the government blast furnace at Cleveland. One of them, a Washington firm, which is defending Mr. Eaton against Security & Exchange Commission charges in connection with Otis & Co.'s declining to carry out an underwriting contract for K-F stock, is counsel in Wheland Co.'s suit, Mr. Kaiser declared.

The other, Mr. Kaiser asserted, is a Cleveland firm representing Otis & Co. in a Delaware suit filed against K-F and now also in the Wheland suit as representative of a "Committee for Foundries Supplied by Republic Steel Corp."

Plants at Auction

WAA tentatively schedules public sales as means of disposing of "hard to sell" properties

NEW POLICY of the War Assets Administration of offering for sale at public auction industrial properties for which it has few or no nibbles is to be used in only a limited way at present. So far only two plants in the ferrous field have been scheduled — and only tentatively so far—for disposal by this method.

These are a steel foundry at Depew, N. Y., and steel casting testing equipment at Renton, Wash. The former was operated in wartime by the Symington-Gould Corp. and the latter by the Pacific Car & Foundry Co.

Recent sales and leases have further cut down the number of industrial plants still left for disposal. In these deals the following plants, identified by names of the wartime operators, have been sold:

Barium Steel Corp., Canton, O., stainless steel ingot and rough forging production facilities, sold to Barium for $193,500.

National Erie Corp., Erie, Pa., steel foundry, sold to National Erie for $125,000.

Rotary Electric Steel Co., Detroit, scrambled electric steel production facilities sold to Rotary for $250,000.

Kropp Forge Co., Chicago, shop for producing aircraft forgings, sold to Kropp for $755,000.

Wenatchee Alloys Inc., Rock Island,

FIVE-ENGINED PLANE: This former B-17 bomber has been converted into a 5-engined flying laboratory by Wright Aeronautical Corp. The newly designed Wright "Typhoon" turbine engine is mounted in the nose section, formerly occupied by the bombardier. A four-bladed electric propeller is used. NEA photo

Wash., plant for producing ferrosilicon, sold to Keokuk Electro-Metals Corp. for $382,000.

Other deals closed of late cover the following plants, identified by names of the wartime operators:

Atlantic Steel Castings Co., Crum Lynne, Pa., steel foundry, disposed of under interim lease to Zimco Enterprises.

Buffalo Brake Beam Co., Buffalo, malleable foundry, disposed of to this company under lease; this leaves a carbon and alloy steel casting plant and a galvanizing plant at this location still in the idle, surplus category.

Columbia Steel Co., Pittsburg, Calif., open-hearth and electric steel foundry, disposed of under interim lease to Pacific States Steel Co.

In addition to the above, of course, is disposal of the Cleveland blast furnace to Kaiser-Frazer Co. Inc., a deal now in process of litigation.

Court Refuses To Block Sale

THE UNITED STATES Court of Appeals at Washington has refused to block a proposed War Assets Administration sale of a blast furnace and other properties at Granite City, Ill., to Missouri-Illinois Furnaces Inc., subsidiary of Koppers Co. Inc.

The court took such action by dismissing an appeal of Fulton Iron Co., Cleveland, and vacated the temporary injunction which the past several months prevented WAA from selling the plant to Missouri-Illinois. Judge Bennett Champ Clark's opinion held that the Fulton company had no legal right to sue the government.

The case involved two blast furnaces, a coke plant and a byproducts plant. They have been leased to Koppers Co. since early 1942.

Surplus Aluminum Plant Sold

SALE of a surplus, government-owned aluminum extrusion plant at Los Angeles has been made by War Assets Administration to Harvey Machine Co., that city, for $1.5 million.

Constructed by the government during the war for production of extruded aluminum shapes, bars and tubes, the plant includes about 38 acres of land, a factory building of 379,000 square feet and accessory structures.

The purchaser, in the "small business" category in the field of extruded aluminum metal, has been operating the property since April, 1946, under a five-year lease. The company has informed WAA it plans to increase its output by addition of other types of manufacture and new developments.

Facts for Industry . . .

Oil Burners

Factory shipments of oil burners in June totaled 29,240 units, up 12 per cent from 26,058 units shipped in May but far below the 105,341 units shipped in June of last year. Shipments of residential type burners and burner units amounted to 27,199 units which were 93 per cent of total shipments. Unfilled orders at the end of June totaled 90,113 units, a slight decrease from the 92,000 units at the end of May and a decline of 89 per cent from the 805,000 units on order at the end of June last year. Shipments for the first six months of this year amount to 150,105 residential units compared with 540,823 units during the same period in 1947. Shipments of commercial and industrial types during the same period amounted to 13,511 for 1948 and 24,534 units in 1947. *Census Bureau, Commerce Dept.*

Magnesium, Wrought

Shipments of magnesium wrought products during August totaled 497,000 lb, more than double the July shipments of 212,000 lb and nearly twice the August, 1947, total figure. Shipments of 3,386,000 lb for the first 8 months of this year, however, were still short of the 3,717,000 lb shipped in the same period of 1947. *Census Bureau, Commerce Dept.*

Malleable Castings

Malleable iron castings shipments during July fell to 64,995 short tons, 20 per cent less than June total of 81,747 tons. Part of the decline is attributable to fact that a number of plants operated only a part of the month due to vacations. Shipments for the first 7 months of the year totaled 543,128 tons, 3 per cent higher than for the same period in 1947. July shipments of rough castings to outside trades were 34,940 tons, 54 per cent of the month's total shipments. New orders booked during July, less cancellations, of castings for sale to outside trades amounted to 36,601 tons, 4 per cent above orders booked during June. *Census Bureau, Commerce Dept.*

Steel Castings

Seasonal factors brought steel castings, at 120,445 short tons for July, to the lowest level since August, 1947. The month's shipments were 21 per cent below those for June but higher than in July, 1947. Shipments of 1,013,374 tons in the first 7 months of 1948 were 8 per cent higher than the 940,586 tons shipped in the same period in 1947. Steel castings shipped for sale to the trade, at 87,927 tons, represented 73 per cent of all shipments. Unfilled orders of steel castings for sale to the trade at the end of July amounted to 497,410 tons, a 6 per cent increase over orders on the books at the end of June. *Census Bureau, Commerce Dept.*

Plumbing Goods

Value of shipments of porcelain enameled cast iron and steel plumbing fixtures for the second quarter of 1948 showed a slight decrease (approximately $200,000) from the $40.2 million figure reported for the first quarter this year. The second quarter total, however, represented an increase of approximately 40 per cent over the $29 million reported for second quarter, 1947, according to the Porcelain Enamel Institute.

During second quarter, unit shipments of porcelain enameled lavatory equipment decreased approximately 5000 units or 1 per cent below the 438,000 units shipped during first quarter. Total of 82,000, or 23 per cent, more lavatory units were shipped during second quarter than in the corresponding quarter of 1947.

Shipments of kitchen sinks dropped slightly (15,000 units) during the quarter from the 649,000 units shipped during first quarter, and were 1.7 per cent below the 645,000 units shipped during the same quarter of 1947.

Water Heaters

Shipments of water heaters, except electric types, during June rose to 167,362 units valued at $7.6 million. This represented an increase of 4 per cent over the 161,358 units shipped in May and a decline of 13 per cent from the 192,372 units shipped in June of last year. June production also increased, rising to 166,346 units from the May total of 158,000 units. *Census Bureau, Commerce Dept.*

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HYATT ROLLER BEARINGS

By A. H. ALLEN *Detroit Editor, STEEL*

Mirrors of Motordom

Buick starting production on 1949 models, to be revealed to public next month. Wheelbases and overall length are shorter, recognizing difficulties in parking and garaging

DETROIT

IT WAS with a definite touch of nostalgia that H. H. Curtice, Buick general manager, drew the curtains on the division's 1949 models last week. He leaves his post at Flint next week to assume new responsibilities at General Motors Corp. in Detroit, after 15 highly successful years with Buick, and even though he no longer will be directly concerned with that division's activities, he indicated his heart would always be there. For the present he plans to maintain his home in Flint and commute to Detroit by air.

Details of the new models cannot be revealed until some time next month when formal announcement is being made. Production of 1948s was concluded last week and the first of the new line is scheduled to be built around Nov. 1, with assemblies gradually picking up to around 1200 daily by Dec. 1. It is the hope to complete 50,000 units by the end of the year, but some of the Buick manufacturing people doubt it will be possible to realize this ambitious planning.

The dynaflow transmission will be standard equipment on the series 70 roadmaster models, currently being assembled at a rate of 450 daily, and optional equipment on the series 50 super models. Tooling is complete on the smaller dynaflow and production was started in a limited way late in September. The only important variation in the two units is in the converter assembly, most of the other parts being interchangeable. A total of 50,426 dynaflow transmissions has been built since production was started.

New Bodies—There are new bodies on the 50 and 70 Buicks, and apparently the series 40 special model will be continued in production with the old bodies until the new General Motors "B" body types are in production next year. Actual date of introduction of this new type body has not been revealed, but it is hoped in some quarters to have it ready by spring. Whether it will be identified as a 1949 or 1950 design is not known, this probably depending upon how soon production can be started.

Buick should wind up the year with about 280,000 units, making it the third largest calendar year volume in the division's history and exceeding last year by around 12,000. Mr. Curtice indicated the outlook for improved steel supply for next year was good, which should permit stepping up Buick output appreciably toward the plant's capacity of 500,000 annually. He said GM would continue the "OPA system" of allocating its steel among divisions on the basis of 1940-41 volume. In his new executive post he will oversee procurement of materials, among other things, and, much as he would like to see Buick get a better break on steel, he will probably have to be content to follow the present distribution pattern.

New Models Shorter—New Buick models have shorter wheelbase and 3-inch shorter overall length, following the trend initiated by Cadillac and the Olds 98 series. This is in recognition of the difficulties encountered by owners in garaging and parking automobiles which were steadily stretching out to the point where handling was becoming a serious problem.

High-compression engines, in the thinking of Buick engineers, are still a few years away, since it will take a considerable period of time for the oil industry to develop the necessary high-octane fuels and perfect their nationwide distribution. Hence the Buick engines will be continued at 6.9:1 compression ratio, although they could be boosted to around 8:1 without requiring any major retooling.

A trip through Buick's elaborate new engineering laboratories, now concluding their first year of operation, is convincing proof of the thorough testing given all the basic components going into the product. Everything from radios to motor mountings is subjected to the most detailed probing and study, and dozens of different types of testing machines have been originated to handle the work.

Automobile Production

Passenger Cars and Trucks—U. S. and Canada

	1948	1947
January	422,236	366,205
February	399,471	393,663
March	519,154	443,588
April	462,323	445,137
May	359,996	404,191
June	454,401	421,466
July	489,736	399,456
August	478,168	364,478
September	432,000*	444,501
9 mos.	4,025,000*	3,682,685
October		461,536
November		417,493
December		492,109
12 mos.		5,055,284

* Preliminary.

Estimate for week ended:

	1948	1947
Oct. 2	121,475	101,608
Oct. 9	119,398	98,978
Oct. 16	122,717	89,100
Oct. 23	120,000	106,159

Estimates by Ward's Automotive Reports

Nash Reveals New Models

SOME Detroit correspondents are getting a little nettled over being shown new models and new products and then having to "sit" on the story until an official release date. They figure that if something is ready to be shown, then why not allow them to write about it. However, that is the way it is being done, so they will just have to go along with the system. The new Nash, for example, was shown to the press the latter part of August, but nothing could be said about it officially until Oct. 21. The fact that a national magazine came out with the full story and pictures Oct. 18 did not make those who "please observe release date" feel any better.

The 1949 Nash represents the first of the industry's postwar models with front wheels totally enclosed. To permit full wheel swing inside the front fenders, it was necessary to reduce the front tread by about 3 inches, to 54 11/16 inches, 5 inches less than the rear tread. This at the same time effected a 2-foot reduction in the turning radius of the 600 series and a 1-foot reduction in the Ambassador series.

Bodies Wider, Lower—Bodies are wider, front seat elbow width being

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PARIS AUTO SHOW: Almost 1000 models from all over the world are displayed at the Paris Automobile Show which opened Oct. 7. American producers are well represented. NEA photo

increased from 57 to 63 inches. They are also lower, overall height now being 62 inches in contrast to 68½ inches.

Distinctive front-end appearance has been achieved with a broad, low hood and massive chrome-barred, racing-type air scoop. At the rear, an unusual combination of tail, stop and directional signal lights plus trunk deck handle and lock, has been incorporated in the lower edge of the trunk lid. Speedometer and all other instruments have been taken off the instrument panel and grouped in a single housing, called a uniscope, mounted on the steering column.

One reason for the new trend in mounting instruments on the steering column or in deeply recessing them on the instrument panel is that conventional mounting arrangements resulted in serious light reflections off the windshield, following the introduction of curved glass panels in windshields. These reflections were so bad that night driving would have been hazardous, so new mounting systems had to be devised. The Nash windshield, incidentally, is a single piece of curved glass, marking the first use of this design. Elimination of the conventional center post has greatly improved visibility.

Twin Beds Offered — Full-length twin beds are available in all two-door and four-door Nash sedan models. Beds are contained entirely within the passenger compartment and to use them it is not necessary to disturb contents of the luggage compartment.

Two radio loudspeakers are provided.

Engineering changes in the series 600 engine include a heavier crankshaft with larger crankpins, resulting in a 25 per cent increase in rigidity. The crankshaft of the larger Ambassador engine has seven main bearings and is 100 per cent counterbalanced with twice the former number of counterweights.

A major carburetor change has been made in both engines in the interests of better economy. Known as the "uniflo-jet" carburetor, it delivers fuel more nearly in accord with engine requirements under all driving conditions and in addition, since gasoline richness is changed more gradually during acceleration, less fuel is wasted and the mixture is leaner for steady-speed operation without sacrificing performance.

Prices Up—Price increases on the Nash line have been announced and average $275 on their series 600 and $390 on the Ambassador. The boost amounts to about 19 per cent, reflecting the complete new tooling required for the cars, higher material costs and additional values built into the models.

Shutdowns Costly

MORE than 12 million new cars, trucks and busses have been built in the three postwar years, and the job of keeping assembly lines moving in the face of materials shortages, strikes and other interruptions has been a major one and a costly one. There have been an estimated 1000 plant shutdowns or production cutbacks in the automotive industry resulting from lack of supplies in the past three years.

As an example of how plant shutdowns increase costs, the case is cited of one assembly plant which was forced to suspend operations for several weeks because of a strike in a supplier's plant. When the assembly plant resumed operations it was found that one-third of its former employees had taken jobs elsewhere, so thousands of new employees had to be recruited and trained. The plant's production schedule called for more than 150 units daily. With thousands of green help on the job, only 23 vehicles passed inspection the first day, and it was a matter of weeks before the new men were sufficiently experienced to meet production schedules. The same problem has been faced by many plants during the postwar years.

Ostrander Succeeds Skinner

STANLEY W. OSTRANDER, former manufacturing manager for Pontiac and more recently in charge of operations of the Ford Highland Park plant, has been appointed manager of operations of the Lincoln-Mercury Division of Ford, succeeding T. W. Skinner, who has resigned to enter his own business. The Highland Park operations will now be directed by Alton J. Hole, who was stamping superintendent at Pontiac before coming to Ford with Mr. Ostrander.

Dearborn Sets Up New Division

ESTABLISHMENT of a new manufacturing and engineering division, and the appointment of Ralph E. Hunt as its manager, have been announced by Dearborn Motors Corp., national marketing organization for the Ford tractor and Dearborn farm equipment. Included in the new division are the following departments: Research and product development, production engineering, master mechanics, quality control, scheduling and methods, and cost analysis. Research and product development and production engineering formerly were supervised by C. R. Powers, who has resigned. Mr. Hunt is a former production specialist with General Motors and Nash-Kelvinator and, prior to joining Dearborn Motors last April, was works manager for Universal Cooler at Marion, O.

What's Interesting About UNION CHAIN'S Selling?

Union Chains for Every Application

Drive and Conveying Chains and Sprockets
- Bridge Chain
- Combination Malleable Iron and Steel Chain
- HB (hardened bearing) type chain
- BP (bar and pin) type chain

★

Finished Steel Roller Chains and Sprockets
- All manufacturer's standard, size ⅜ in. to 2½ in. pitch
- Single and Multiple Strands
- Extended Pitch Series in sizes 1¼ in. to 4 in. pitch

★

Silent Chain and Sprockets
- All sizes ⅜ in. to 1½ in. pitch

★

Flexible Couplings
- Roller chain type
- Silent chain type

In each principal market there is a UNION Chain Sales Representative who has been trained to serve as a consultant on chain applications. Throughout each Sales Representative's Territory are selected distributors who try to inventory stocks of those chains and sprockets which are in steady demand. These Distributors make regular factory visits for instruction in recommending the proper chain for each task.

Because UNiON manufactures a complete line of steel sprocket chains and **nothing else**, it is possible to offer you an exceptional field organization, qualified by training to assist you with your chain problems. Write for the name of the representative or distributor in your territory.

The Union Chain and Manufacturing Company TRANSMIT POWER UNION CHAINS CONVEY MATERIALS **Sandusky, Ohio, U.S.A.**

New Electronics Plant

Western Electric installation provides high flexibility, maximum conditions control

WESTERN Electric Co. has completed a new electronics plant at Allentown, Pa., which provides a high degree of flexibility and enables its operators to control closely manufacturing conditions.

The plant, designed and built by the Austin Co., Cleveland, provides 100-foot clear spans throughout four 325-foot aisles in the main manufacturing area and arrangement of special process departments and employee facilities around the perimeter of the plant.

Power and service lines are accessible to more than 5000 different machine locations. This is made possible by a system of 40 miles of pipe, ranging from ½ to 6 inches in diameter. This will permit the plant to meet the fast-changing demands of electronics manufacture without major expenditure of alterations.

Principal metalworking operations at Western Electric Co.'s new electronics plant in Allentown, Pa., are concentrated in this ground floor area. Overhead power distribution, piping and other service lines provide a high degree of flexibility

Clark Bros. Expands

CLARK Bros. Inc., Olean, N. Y., a subsidiary of Dresser Industries Inc., has entered into an agreement with Frederic Flader Inc., an engineering and research organization at North Tonawanda, N. Y., whereby Clark will manufacture and distribute gas turbines and axial compressors of the Flader design for general industrial use.

Flader will be responsible for research engineering and design, while Clark will manufacture and market the products. The gas turbine is suitable for ships' propulsion, locomotive power and for driving air compressors, electric generators, pumps and other industrial machinery. The axial compressor has applications in the mining, petroleum and chemical fields which Clark serves.

Boost Silicon Steel Output

INCREASED production of silicon steel for electrical industry will result from a modernization of facilities recently completed at the Vandergrift, Pa., plant of Carnegie-Illinois Steel Corp., Pittsburgh.

Among the new facilities are: Two continuous type coil annealing lines, a 54-inch cold reduction mill, a temper rolling mill and a gas fired continuous annealing line, all to be used in the making of silicon steel for transformers, motors and generators. Operation of outmoded galvanizing facilities at the Vandergrift plant has been discontinued and about 150 employees will be transferred.

Beaumont, Atlas Join Forces

BEAUMONT Iron Works Co., Beaumont, Tex., and Atlas Engineering Works, Houston, Tex., will combine their resources to produce and sell throughout the world the "Dreadnaught" line of oil well exploratory, producing and drilling equipment. Beaumont is a subsidiary of American Locomotive Co. and will handle production, while Atlas will take over sales of oil field goods.

Oxygen Plant Begins Operations

OPERATIONS have begun in a plant constructed for the production of low purity oxygen for use in blast furnace air blast at the Johnstown, Pa., plant of Bethlehem Steel Co. Output of the plant will be used by Bethlehem in oxygen enrichment experiments aimed at speeding operations.

Equipment for the new plant was designed by Air Reduction Co. Inc., New York, and installed by Koppers Co. Inc., Pittsburgh.

Huge Expansion for Gas Industry

GAS utility industry will need $3.3 billion to complete its construction program through 1952, the American Gas Association reports.

About 80 per cent, or $2,650,000, of the capital to be sought will be required by natural gas firms and pipeline companies, while only little more than 15 per cent, or about $500 million will be allocated to companies marketing manufactured gas. The remaining 5 per cent, or $150 million, will be needed by those companies marketing gas mixtures.

CED Enlarges Policy Group

RESEARCH & Policy Committee of the Committee for Economic Development has been enlarged by the addition of seven new members, bringing the total membership to 27.

New members of the group, which is responsible for statements on national policy, are: W. L. Clayton, Anderson, Clayton & Co., Houston, Tex.; S. Sloan Colt, president, Bankers Trust Co., New York; Henry Ford II, president, Ford Motor Co., Detroit; Amory Houghton, board chairman, Corning Glass Works, Corning, N. Y.; Meyer Kestnbaum, president, Hart, Schaffner & Marx, Chicago; William A. Patterson, president, United Air Lines, Chicago; and H. Christian Sonne, president, Amsinck, Sonne & Co., New York.

Navy Buying Procedures Listed

PROCEDURES to be followed and general procurement information are outlined in "Selling to the Navy," a booklet designed particularly for the assistance of small business firms in the United States.

Copies are available from the Navy Department or any Naval supply officer.

Briefs . . . .

Paragraph mentions of developments of interest and significance within the metalworking industry

Preco Inc., Los Angeles, has entered into an agreement with Caterpillar Tractor Co., Peoria, Ill., whereby it will manufacture No. 1 & 2 terracers for sale through Caterpillar distribution channels.

—o—

Diamond Alkali Co., Cleveland, announces formation of a Technical Service Division to cover all phases of service work connected with the sale and use of Diamond-made alkalies, co-products and derivative specialty chemicals.

—o—

Cutler - Hammer Inc., Milwaukee, has appointed Communications Electrical Equipment & Supply Co. Inc., Manila, as a distributor of its apparatus in the Philippine Islands.

—o—

Atlantic Basin Iron Works, Brooklyn, N. Y., will sell its block square plant at public auction on Nov. 17. The site comprises eight buildings with a floor space of approximately 136,000 sq ft and situated 1000 feet from the Brooklyn traffic terminal of the Brooklyn-Battery Tunnel which is now under construction.

—o—

Censuses of Mineral Industries and Transportation covering the year 1948 will not be taken since the request for funds to carry out the projects was not approved by Congress. A comprehensive national census of transportation has never before been taken but a census of mineral industries has been taken once every decade by the Department of Commerce from 1840 to 1940.

—o—

Standard Gas Equipment Corp., Baltimore, maker of domestic gas ranges and commercial gas heating equipment, has been acquired by the Rose-Moskowitz Syndicate, headed by S. G. Rose and Phillip L. Moskowitz, Cincinnati. The company's branch plant, Alabama Foundry Co., Birmingham, was also included in the transaction. Change of ownership involves no alteration in the name, personnel or products of the company, but in the reorganization of the board of directors, Mr. Moskowitz was named chairman with W. Frank Roberts continuing as president of Standard Gas Equipment.

—o—

Electric Spravit Co., Sheboygan, Wis., has announced the purchase of complete manufacturing rights, inventory and tooling for the production of a line of stationary compressors from Auto Compressor Co., Wilmington, O.

—o—

Doehler-Jarvis Corp., New York, has acquired the former Gordon Manufacturing plant in Toledo, O. The new facilities will be used for plating large die castings produced at the present Toledo plant of Doehler-Jarvis.

—o—

Schnacke Mfg. Co., Evansville, Ind., maker of air conditioning equipment and other products, has formed a garden tool department for the production of this line of items.

—o—

J. H. Deppeler has taken a leave of absence from his position as chief engineer at Metal & Thermit Corp. and has established an office as a consulting engineer on welding and related problems at 36 W. 49th St., New York.

—o—

United States Rubber Co., New York, is equipping the synthetic rubber plant it operated for Reconstruction Finance Corp. at Naugatuck, Conn., for production of the newly developed cold rubber.

—o—

Cooper-Bessemer Corp., Mount Vernon, O., plans to begin production by next July on an adaptation of the turboflow development to the 4-cycle gas engine. Company engineers report that the adaptation permits 14 per cent more power while cutting fuel cost by at least 20 per cent.

—o—

Sinclair Refining Co., New York, celebrated the opening of its research and development laboratories at Harvey, Ill., on Oct. 22. The laboratories are designed to explore all phases of petroleum development, from production of oil from oil-shale and coal to the improvement of lubricants, fuels and other products in daily use.

—o—

Oil-Heat Institute predicts that improved supplies of heating oils will boost oil burner installations in the remaining months of 1948 to 530,000 units, compared with 880,000 in 1947 and 330,000 in 1941. Sales in the early part of this year fell as the result of oil shortages.

—o—

Ampco Metal Inc., Milwaukee, has named the following firms as distributors for its welding electrodes: Welding Engineering Sales Corp., Buffalo and Syracuse; Southern Oxygen Co. Inc., Knoxville, Tenn.; Arizona Welding Equipment Co., Phoenix, Ariz.

—o—

Elgin National Watch Co. announces that its Sapphire Products Division, located in Aurora, Ill., has been renamed Industrial Products Division. The new name has been adopted to describe more accurately the expanded list of precision products the unit fabricates.

—o—

Fenn Mfg. Co., Hartford, Conn., has bought from Standard Machinery Co., Providence, R. I., its line of metal rolling mills, punch presses and other devices. Manufacture of these products, to be transferred gradually to Hartford, will supplement Fenn's line of custom-built machinery for the textile, woodworking and other industries.

—o—

Can Manufacturers Institute, New York, announces metal can shipments to packers of all types of products for the first six months of 1948 are about 15 per cent ahead of shipments for the same period in 1947. Total shipments from January to June amounted to 1,338,609 tons.

—o—

Brooks Oil Co., Cleveland, conducted an open house and plant tour on Oct. 1 for more than 200 engineers and plant superintendents attending the American Iron & Steel Engineers Exposition. The open house marked the completion of an expansion program which has more than doubled production capacity.

—o—

National Bureau of Standards, Washington, in co-operation with technical committees of Industrial Mineral Wool Institute, New York, has prepared engineering standards for use and application of mineral wool insulation in plants and refineries.

—o—

Byrne Doors Inc., Detroit, has moved its main office and manufacturing plant to new buildings. Main office is now located at 1421 East 8 Mile Road, Ferndale.

—o—

Davison Chemical Corp., Baltimore, expects to transfer its general offices to the Davison Building, 101 North Charles Street, next June.

—o—

Rohr Aircraft Corp., Chula Vista, Calif., announces that because of its rapid postwar expansion, it is moving into War Assets Administration buildings abandoned at end of the war.

The Business Trend

INDUSTRIAL production continues high and steady with the result STEEL's index for the week ended Oct. 16 registers a preliminary 175 per cent of the 1936-1939 average, the third consecutive week it has been at this postwar peak.

Steel ingot output, advancing one point during the week, attained 98 per cent of capacity and equaled the year's high which was reached during the week ended Jan. 17. The latest figure caps two months of uninterrupted operation at levels of 95 per cent of capacity or better.

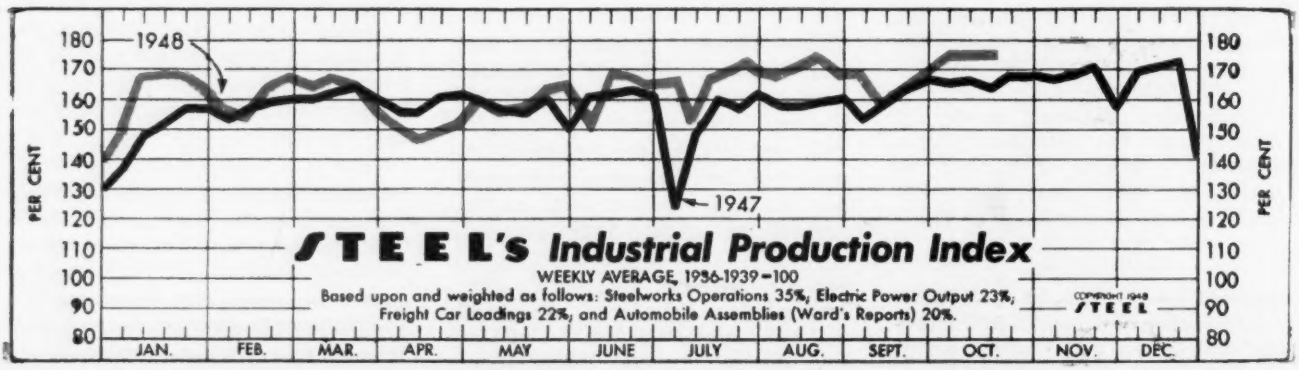
AUTOMOBILES—Also currently enjoying peak production is the automobile and truck building industry of the United States and Canada. During the week ended Oct. 16, production of 122,717 units set a new postwar record. In addition, the 4-millionth U. S. vehicle for 1948 rolled off an assembly line during the week. Some decrease in output during the next few weeks is anticipated as various assembly lines go down to make model changeovers.

CARLOADINGS — Despite great industrial activity throughout the nation, freight carloadings on the railroads this year will be about 3.5 per cent below 1947, according to an estimate by the Association of American Railroads. The association is conducting a survey to determine why loadings are lagging behind last year's volume in the peak shipping season. Factors believed responsible for the decline are a slackening of freight movements because of lower inventories or a loss of business to truckers who reported a 20 per cent increase in August over the same month in 1947. In addition to these factors the association reports freight car shortages in some areas.

PETROLEUM—American Petroleum Institute reports a new high of 5,534,800 bbl in daily crude oil production in the week ended Oct. 9. Runs to refineries were also increased to levels reached before the start of the West Coast oil strike on Sept. 4. Boosts in stocks of petroleum products during the week ended Oct. 9 resulted in the following current totals: Gasoline, 91.4 million bbl; light fuel oil, 77.9 million bbl and heavy fuel oil, 78.2 million bbl.

COAL—Current bituminous coal production and aggregate output for the year are below those of 1947, the output for the week ended Oct. 9 being 11,870,000 net tons compared with 12,839,000 tons in the corresponding week last year. Output to Oct. 9 this year totals 449.7 million tons compared with 474.8 million tons for the corresponding period of last year. However, stocks have been on the increase. At the beginning of September, inventories were 64,057,000 net tons, highest since late 1944.

PRICES—Wholesale prices registered a further decline of 1.5 per cent for the week ended Oct. 9, according to the Bureau of Labor Statistics. The bureau's index of all commodities at 164.6 per cent of the 1926 average declined primarily because of sharply lower prices in a number of food products.



Index (chart above): Week ended Oct. 16 (preliminary) 175 Previous Week 175 Month Ago 168 Year Ago 164

BAROMETERS of BUSINESS

INDUSTRY	Latest Period*	Prior Week	Month Ago	Year Ago
Steel Ingot Output (per cent of capacity)†	98.0	97.0	96.0	96.0
Electric Power Distributed (million kilowatt hours)	5,482	5,482	5,426	4,946
Bituminous Coal Production (daily av.—1000 tons)	1,978	1,941	1,796	2,140
Petroleum Production (daily av.—1000 bbl.)	5,586	5,535	5,294	5,268
Construction Volume (ENR—Unit $1,000,000)	$170.2	$170.2	$183.3	$91.3
Automobile and Truck Output (Ward's—number units)	122,717	119,398	94,410	89,180

* Dates on request. † 1948 weekly capacity is 1,802,476 net tons. 1947 weekly capacity was 1,749,928 net tons.

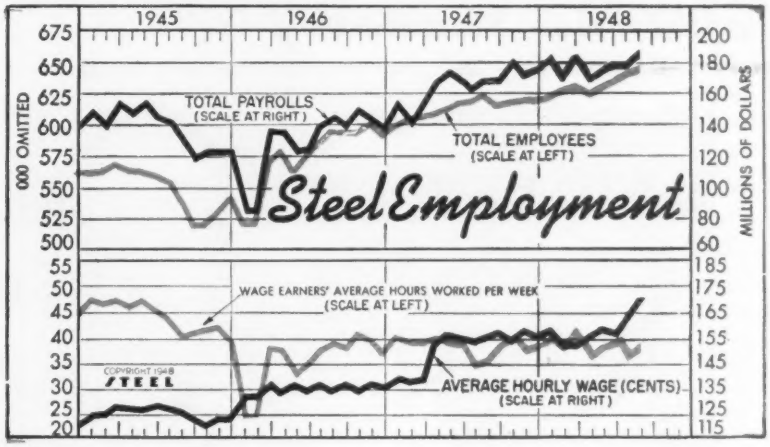
TRADE				
Freight Carloadings (unit—1000 cars)	890†	892	910	957
Business Failures (Dun & Bradstreet, number)	94	107	84	75
Money in Circulation (in millions of dollars)‡	$28,284	$28,202	$28,156	$28,656
Department Store Sales (change from like wk. a yr. ago)‡	+11%	none	−2%	+18%

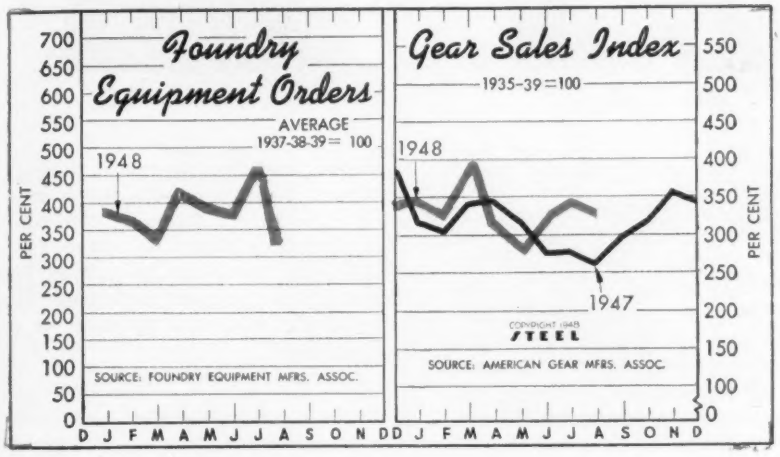
† Preliminary. ‡ Federal Reserve Board.

Steel Employment

	Employees† (000)		Total Payrolls (millions)		Hourly Wages† (cents)	
	1948	1947	1948	1947	1948	1947
Jan.	622	601	$180.2	$155.8	157.3	138.1
Feb.	626	607	167.6	139.5	155.1	137.0
Mar.	629	609	183.0	150.6	154.8	137.9
April	626	611	168.5	168.3	155.1	153.3
May	628	615	175.3	175.8	157.7	155.6
June	634	623	179.5	167.6	156.9	154.7
July	641	623	179.8	163.2	164.5	153.9
Aug.	645	625	193.8	169.1	168.9	155.6
Sept.	618	....	168.9	....	157.1	
Oct.	620	....	180.1	....	154.6	
Nov.	624	....	171.0	....	158.7	
Dec.	621	....	175.3	....	156.5	

† Monthly average.





	Foundry Equipment Orders* —Index— (1937-38-39=100)	Gear Sales —Index— (1935-39=100)	
	1948	1948	1947
January	380.9	346.8	317.0
February	367.3	324.4	303.0
March	326.2	389.8	342.9
April	412.0	320.9	346.2
May	388.5	283.6	317.2
June	376.8	324.1	278.0
July	456.3	348.4	278.5
August	324.7	335.6	261.6
September	....	....	297.7
October	....	....	317.7
November	....	....	356.9
December	....	....	343.6

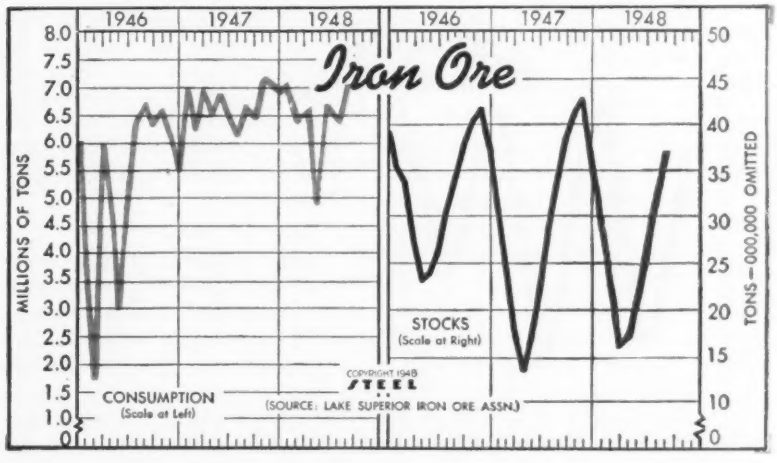
* By foundry trades only.

Iron Ore

(Lake Superior Iron Ore Assn.)

Gross tons—000 omitted

	Consumption		Stocks at Lake Erie Docks and Furnaces	
	1948	1947	1948	1947
Jan.	7,057	7,024	29,081	30,514
Feb.	6,440	6,264	22,628	24,317
Mar.	6,634	6,979	16,022	17,411
Apr.	4,976	6,579	17,125	13,555
May	6,656	6,885	22,058	17,618
June	6,577	6,500	26,965	21,746
July	6,479	6,156	32,611	28,440
Aug.	7,036	6,638	37,081	33,896
Sept.	....	6,492	.....	38,370
Oct.	....	7,151	.....	41,641
Nov.	....	7,068	.....	43,010
Dec.	....	6,970	.....	36,095
Total	....	80,807		



FINANCE

	Latest Period*	Prior Week	Month Ago	Year Ago
Bank Clearings (Dun & Bradstreet—millions)	$10,842	$14,150	$13,454	$11,343
Federal Gross Debt (billions)	$252.4	$252.3	$252.0	$259.2
Bond Volume, NYSE (millions)	$11.9	$15.2	$13.7	$22.2
Stocks Sales, NYSE (thousands)	3,625	3,484	3,352	6,884
Loans and Investments (billions)†	$62.1	$61.9	$63.3	$64.7
United States Gov't. Obligations Held (millions)†	$33,174	$32,559	$34,652	$38,373

† Member banks, Federal Reserve System.

PRICES

STEEL's composite finished steel price average	$95.05	$95.05	$95.05	$75.41
All Commodities†	164.6	167.1	168.0	158.0
Industrial Raw Materials†	176.7	179.7	180.9	152.1
Manufactured Products†	160.5	163.1	163.9	151.7

† Bureau of Labor Statistics Index, 1926=100.

Men of Industry

FRANK B. POWERS

JOHN H. BATTEN

DANIEL A. SCHAITBERGER

American Car & Foundry Co., New York, announces the appointment of **Frank B. Powers** as assistant vice president, production department. He previously had been with the Baldwin Locomotive Works, Philadelphia, which he joined in 1947 as vice president in charge of engineering. Mr. Powers had been affiliated with Westinghouse Electric Corp. in engineering and manufacturing fields from 1926 to 1944, and later became vice president in charge of operations, Great American Industries Inc., New York. He resigned that position to join Baldwin Locomotive Works.

—o—

Stanley Claster, formerly assistant manager, St. Louis office, Luria Bros. & Co., Philadelphia, has been named manager of the San Francisco office, recently established by the company.

—o—

Baldwin Locomotive Works, Philadelphia, announces appointment of **E. R. Wisner** as assistant to the vice president in charge of sales, Eddystone Division. He has been district manager of Baldwin sales office, covering the Philadelphia district, since June, 1947. **Walker H. Evans** has been appointed district manager at Philadelphia to succeed Mr. Wisner.

—o—

A. G. Koenig has been appointed general sales manager, and **G. A. Terhune,** advertising manager, C. J. Tagliabue Corp., subsidiary of Weston Electrical Instrument Corp., at Newark, N. J. Mr. Koenig served as general sales manager of the Tagliabue Co. before its purchase by Weston. Mr. Terhune continues his affiliation with Tagliabue, which began in 1929. He had previously been advertising manager, Chicago Pneumatic Tool Co.

—o—

John H. Batten has been elected president, Twin Disc Clutch Co., Racine, Wis. He succeeds **P. H. Batten,** founder of the company, who previously held the positions of president and chairman of the board, and retains the latter position. The new president joined the company in 1935 following graduation from Yale University. After assuming various executive positions with the company, he was elected vice president and assistant general manager in 1943, and two years later was made executive vice president, which position he held at the time of his recent election as president.

—o—

Great Lakes Steel Corp., Detroit, announces the appointments of **Frank F. Ford** and **Clement N. Page** as sales representatives for the company's nailable steel flooring. Mr. Ford will be located in Atlanta. He has been connected with the Alloy and Stran-Steel Divisions of the company. Mr. Page will have offices in Philadelphia. He formerly was associated with Evans Products Co.

—o—

R. S. French, formerly research metallurgist for Bridgeport Brass Co., Bridgeport, Conn., for the past 10 years, has resigned his position, and has been elected vice president of Metallurgical Products Co., Brookline, Mass. His office will be located in Bridgeport, and he will handle sales, service and consulting engineering for this company in Connecticut.

—o—

Walter C. Bates has been named manager, and **Dr. George F. Rugar,** assistant manager of the newly created Technical Service Division, established by Diamond Alkali Co., Cleveland. This division will be located at the company's Painesville, O., plant, but will function as a separate unit.

—o—

Daniel A. Schaitberger has been elected vice president in charge of sales, Northern Engineering Works, Detroit. Serving continuously in sales since he joined the company in 1927, he has also assisted in the development of crane and hoist controls, and of the Travelator, an electric operating conversion unit for hand powered cranes.

—o—

Trumbull Electric Mfg. Co., Plainville, Conn., announces the appointment of **H. S. Hill** as manager of its office in Schenectady, N. Y. In his new assignment he will be responsible for all Trumbull relations with General Electric Co. He joined the company in 1926, and in 1944 was made district sales manager of the southeast district, which post he held until his recent transfer. Another appointment is that of **A. T. Allison** as district manager of the southeast sales district, succeeding Mr. Hill.

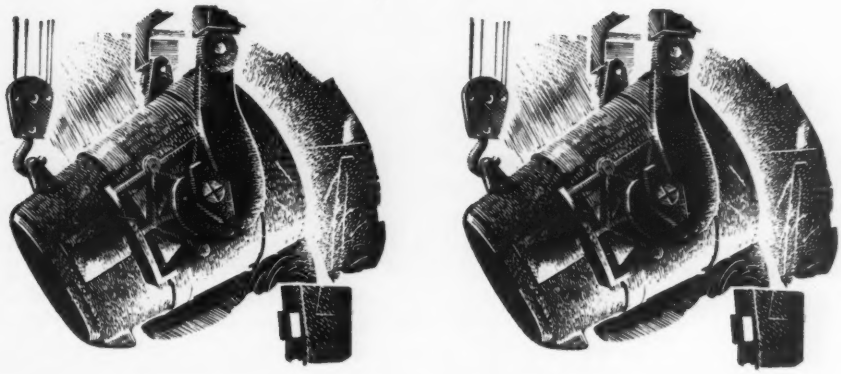
—o—

Arthur F. Olson, personnel director, George Gorton Machine Co., has been elected president, Racine, Wis., Personnel Directors Council. He succeeds **William Dowman,** S. C. Johnson & Son Co. **Walter Robetcky,** personnel director, Walker Mfg. Co., has been elected vice president.

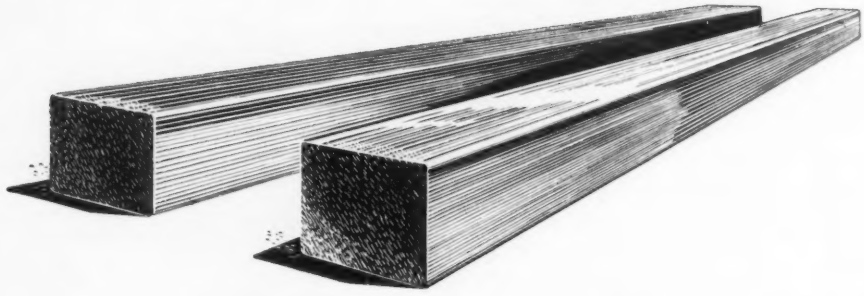
—o—

J. A. McMahon, Rigid-Tex Corp., Buffalo, has been appointed Cleve-

For UNIFORMITY from heat to heat



...and from bar to bar



...get Timken® forging bars

Uniformly high quality in Timken forging bars helps you maintain consistent quality in your product. It cuts production costs, too, through fewer delays, fewer rejects and fewer changes in shop practices.

You can depend on the analysis you use to give you the same forgeability, the same superior surface and internal quality, the same response to heat treatment, and the same machinability from heat to heat and from bar to bar. That's because we completely control the quality from melting through final inspection.

For help with your problems, write us today. Ask for our 112-page book, "Evaluating the Forgeability of Steels". The Timken Roller Bearing Company, Steel and Tube Division, Canton 6, Ohio. Cable address: "TIMROSCO".

YEARS AHEAD—THROUGH EXPERIENCE AND RESEARCH

TIMKEN

TRADE-MARK REG. U.S. PAT. OFF.

Fine Alloy

STEEL

and Seamless Tubes

Specialists in alloy steel—including hot rolled and cold finished alloy steel bars—a complete range of stainless, graphitic and standard tool analyses—and alloy and stainless seamless steel tubing.

land district sales representative of Rigidized metal.

—o—

Al J. Harris, plant engineer of Farm Tools Inc., Evansville, Ind., has succeeded **Adolph Volderauer** as manager, Vulcan Plow Division, Farm Tools. Mr. Volderauer has also retired as vice president of the company, which he joined as a billing clerk employee 49 years ago when it was known as the Vulcan Plow Co.

—o—

Cedric A. Roberts has been appointed engineer of structures, Erie Railroad, succeeding the late **A. A. Visintainer.**

—o—

Sterling Mfg. Co., Cleveland, has named **William L. Sayre,** Daytona Beach, Fla., as its Florida representative. He formerly was associated with General Electric Co. for over eight years, and had been district sales manager for Crosley Radio Corp.

—o—

Harold F. Kirkpatrick has been elected vice president of Marsh Steel Corp., Kansas City, Mo. He has been manager of purchases for the company since Jan., 1946, six months after it was founded. He previously had been with Columbian Steel Tank Co., Kansas City, for 14 years.

—o—

William F. McConnor, vice president in charge of sales, National Tube Co., Pittsburgh, has been named chairman of the Industry Manufacturers Section of the American Gas Association.

—o—

F. J. C. Dresser, formerly president of the Dresser Co., Cleveland, and more recently a member of the Construction Advisory Board of the War Department, and consulting engineer, Mutual Life Insurance Co., New York, announces opening of an office at 1737 De Sales St., N. W., Washington. He will act as consulting engineer for business concerns both in this country and abroad, and will be associated with **Robert Leland,** president, Leland, Brinckerhoff & Co. Inc., New York and Washington.

—o—

Hubert Chappie, veteran of 29 years in foundry operations, has been appointed superintendent of the foundry at Torrance, Calif., plant, National Supply Co.

—o—

B. L. Lerch has been appointed factory branch manager at St. Louis for General Controls Co. He joined the company a year ago as branch manager of the Dallas, Tex., office. Formerly he served for 10 years with Mercoid Corp., Chicago.

—o—

Frank T. Ostrander, vice president in charge of the New York office of National Supply Export Corp., Pittsburgh, has retired from that position after 43 years of service with the National Supply organization. He will remain with the corporation in an advisory capacity.

—o—

Jones & Laughlin Steel Corp., Pittsburgh, announces the appointment of **R. B. Algie** as assistant manager of sales, wire products. He was first employed by the company in the New York district sales office in 1927. In 1944 he was appointed resident manager of sales at New Haven, Conn. Mr. Algie became associated with the wire products sales department in Pittsburgh in 1947.

—o—

Dr. G. E. F. Lundell has retired from active duty as chief of the Chemistry Division, National Bureau of Standards, and **Dr. Edward Wichers,** former assistant chief, has been appointed division chief. Mr. Lundell will remain on the bureau staff as consultant to the division. **Dr. William Blum,** head of the electrodeposition section, has been named assistant chief. **Andrew P. Massey** has been appointed to the staff of the engineering electronics section of the National Bureau of Standards, where he will head the electronics standardization group. **Dr. Willard H. Bennett** has been named head of the physical electronics section of the Atomic & Molecular Physics Division.

—o—

Warren A. Silliman, formerly chief metallurgist, Cletrac Division, Oliver Corp., is now associated with Technical Metal Processing Inc., commercial metal-joining and induction heat-treating plant in Cleveland. Mr. Silliman was chairman of the Cleveland Chapter, American Society for Metals, in 1947-48, and also has been active in the Society of Automotive Engineers and the American Society for Testing Materials.

—o—

Herman C. Phelps has been appointed sales manager, All-State Welding Alloys Co. Inc., White Plains, N. Y. Formerly All-State's West Coast regional sales manager, operating out of Seattle, Mr. Phelps has moved to White Plains, assuming national duties in connection with sales and service for the entire line of All-State low-temperature welding and brazing alloys and fluxes.

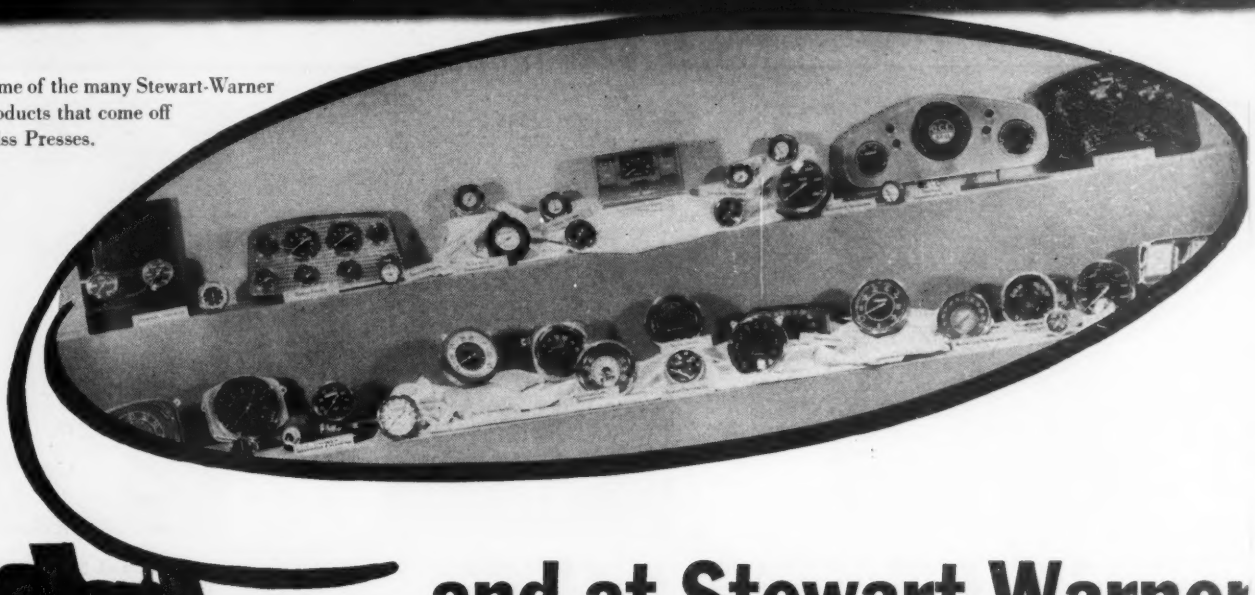
—o—

Lyle A. Christensen, general sales manager, Marley Co. Inc., Kansas City, Kans., manufacturer of water cooling equipment, has been appointed a vice president of the company. He has been associated with the company for seven years, first serving as sales engineer in the New York office for five years, and later moving to Kansas City as general sales manager. Before joining Marley Co., Mr. Christensen was associated with

WILLIAM F. McCONNOR

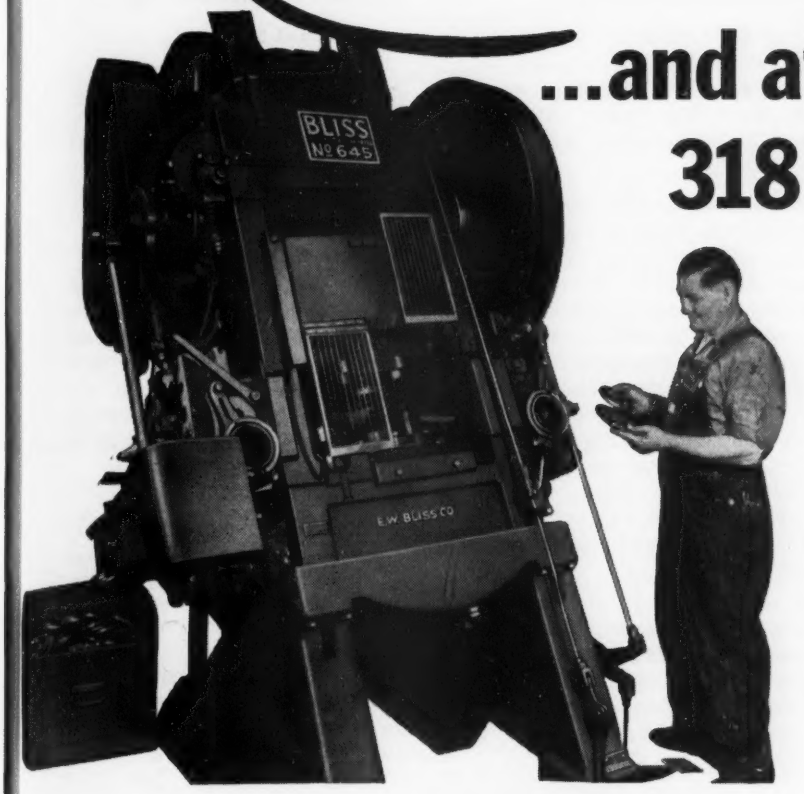
R. B. ALGIE

LYLE A. CHRISTENSEN

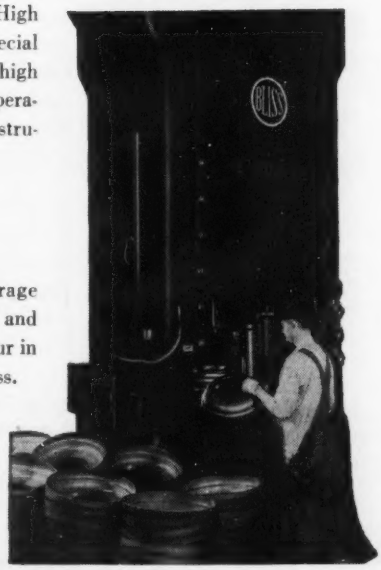


Some of the many Stewart-Warner products that come off Bliss Presses.

...and at Stewart-Warner 318 BLISS PRESSES



One of a battery of 10 Bliss High Production Presses, with special fixed inclined legs, used for high speed blanking and forming operations in Stewart-Warner's instrument division.



Steel covers for Alemite garage service equipment are pierced and trimmed at rate of 115 per hour in this Bliss 300-ton enclosed press.

Just picture the range of different stamping problems involved in producing such a diversified line of products as speedometers, radios, lubrication service equipment, industrial gauges, car and aircraft heaters, and hardware. That's a sampling of Stewart-Warner's line. Then consider the variety of types and sizes of presses required.

It's one reason why a high proportion of Stewart-Warner's press equipment is Bliss-Built—high production presses, batteries of inclinables, enclosed presses and coining presses, among others.

Why does Bliss have such acceptance on this and so many other pressed-metal production lines?

Because Bliss' field-trained engineers first analyze a customer's production requirement, then help select the *right press for the job.* At Stewart-Warner, high production presses were recommended for certain large quantity stampings while knuckle joint presses were adapted for sizing and swaging. The result is a steady output of uniformly good stampings produced more economically and efficiently.

Let a Bliss sales engineer help you get the most out of your presses—mechanical or hydraulic. You'll be drawing on a fund of engineering knowledge developed over 90 years. And you'll see why "Bliss" on your press is more than a name—it's a guarantee. Send for him today.

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Mechanical & Hydraulic Presses, Rolling Mills, Container Machinery

WORKS AT: Toledo, Cleveland, Salem, Ohio; Hastings, Mich.; Englewood, N. J.; Derby, England; St. Ouen sur Seine, France. SALES OFFICES AT: Detroit, Hastings, Mich.; New York, Rochester, N. Y.; Cleveland, Dayton, Toledo, Salem, Ohio; Philadelphia, Pittsburgh, Pa.; Chicago, Ill.; New Haven, Conn.; Windsor, Ont.

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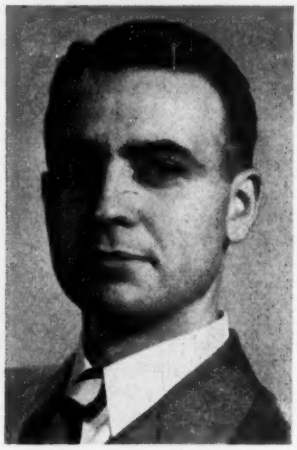
BLISS BUILT

BLISS BUILDS MORE TYPES AND SIZES OF PRESSES THAN ANY OTHER COMPANY IN THE WORLD

D. A. HUTCHISON

E. J. CAMPBELL



THOMAS L. JENNER

Ingersoll-Rand Co. for 12 years.

—o—

D. A. Hutchison has been named general sales manager, Sterling Tool Products Co., Chicago, manufacturer of portable sanding machines. Formerly assistant sales manager, he succeeds **J. A. Proven,** resigned. **H. P. Gangwer,** comptroller, has been named vice president of the company.

—o—

Harvey B. Merrill has rejoined the sales staff, engineering products department, Radio Corporation of America, RCA Victor Division, after a year's absence. He has been named sales engineer for the eastern United States with the scientific instrument group.

—o—

Robert J. Casterton has been appointed sales representative in the Pittsburgh district sales office of Spang-Chalfant Division, National Supply Co. He succeeds the late **William F. Hart.**

—o—

Packaging Machinery Manufacturers Institute, New York, has elected the following officers for the ensuing year: **H. Kirke Becker,** president, Peters Machinery Co., Chicago; **John P. Corley,** vice president, Miller Wrapping & Sealing Machine Co., Chicago; and **Edward G. Kuhn,** president, Consolidated Packaging Machinery Corp., Buffalo.

—o—

C. W. Staacke, belt conveyor engineer, and a member of the engineering staff of B. F. Goodrich Co., Akron, for 22 years, has joined Hewitt-Robins Inc., New York, as a technical consultant.

—o—

Adrian Van Kampen has been appointed to the Southwest Sales Division, Kerotest Mfg. Co., with headquarters at Houston, Tex. He will cover the territory formerly serviced by **Walter Cox.** Mr. Van Kampen has been associated with Allis-Chalmers Mfg. Co. as sales engineer.

—o—

E. J. Campbell, sales representative for Wolverine Tube Division, Calumet & Hecla Consolidated Copper Co., Detroit, with headquarters at Grand Rapids, Mich., has been promoted to assistant manager of mid-western sales. He will have headquarters in the company's Chicago office, and will assist in the supervision of sales throughout nine mid-western states. **S. C. Seekell,** formerly sales manager, Westinghouse Electric Supply Co., has been appointed to succeed Mr. Campbell as sales representative at Grand Rapids.

—o—

Joseph E. Williams has been appointed superintendent, Youngstown Sheet & Tube Co.'s rod and wire works at Struthers, O., succeeding **J. H. Shilling,** recently retired. He was superintendent of the wire mill for Northwestern Steel Wire Co. at Sterling, Ill., and later plant superintendent for Reynolds Metals Co., Louisville.

—o—

Allen R. Sowle has been promoted from master mechanic to manager of quality control for Bendix Home Appliances Inc., South Bend, Ind.

—o—

George D. Davis, district manager, Car Service Division, Association of American Railroads at Omaha, Nebr., has been appointed district manager at Detroit to succeed **R. D. Rifenburgh,** who died recently. **Thomas W. Flickinger,** assistant manager of the refrigerator car section in Chicago, has been named district manager, Car Service Division, at Omaha.

—o—

Appointment of **Al Bailey** as general manager has been announced by Kieley & Mueller, manufacturer of automatic control valves, North Bergen, N. J. He will make his headquarters at the company's plant at North Bergen, but in addition will spend considerable time with Kieley & Mueller distributors throughout the United States.

—o—

Thomas L. Jenner has been transferred to the Pratt & Whitney Chicago office, where he will be associated with machine tool sales in that division of Niles-Bement-Pond Co. Mr. Jenner was formerly at the Pratt & Whitney main office in West Hartford, Conn.

—o—

Michigan Seamless Tube Co., South Lyon, Mich., announces appointment of **Ernest A. Wiberg** as works manager of the company.

—o—

Ludwig Skog, senior partner of Sargent & Lundy, Chicago firm of consulting engineers, has been elected to membership on the board of Illinois Institute of Technology. Mr. Skog was born in Norway and obtained his degree in mechanical engineering there. In 1910 he joined his present firm as a draftsman and has held a number of positions prior to becoming senior partner in the past year.

—o—

Monroe B. Lanier, Birmingham, and **J. M. Griser,** Mobile, Ala., have been appointed as members of the Oil Tank Builders & Repairers Industry Advisory Committee, Office of Industry Cooperation.

—o—

I. G. Ross has been named general sales manager, John Bean Division, Food Machinery & Chemical Corp. He succeeds **Ralph W. Cook,** resigned.

—o—

Theodore C. Gams, consultant in industrial electronics, has been appointed director of the School of In-

dustrial Technology, New York. He held an undergraduate assistantship on the electrical engineering faculty at Columbia University. First employed by Radio Corporation of America, Mr. Gams later became a senior project engineer in the electronic department, Otis Elevator Co. In 1945 he was appointed chief engineer, Electronic Research & Development Co., and then took a similar position with Allied Laboratory Instrument Inc.

—o—

Joseph A. Martino, president, National Lead Co., has been elected to the board of Doehler-Jarvis Corp., New York.

—o—

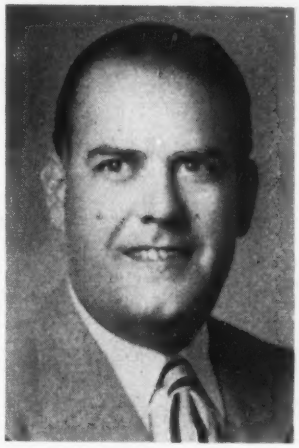
George D. O'Neill, assistant to the manager of research, Sylvania Electric Products Inc., Flushing, N. Y., has been elected Fellow by the board of directors of the Institute of Radio engineers. He will receive a Fellowship Award for his work in electron tube theory and design during the institute's national convention in March, 1949.

—o—

Otto L. Schweng has been appointed to the newly created post of director of market research, Diamond Alkali Co., Cleveland. For the past four years, Mr. Schweng has been economic specialist in the development department, General Aniline & Film Corp.

—o—

L. D. Yager has been appointed division manager of the Detroit sales office, Aluminum Division, and industry manager, Automotive Division, Reynolds Metals Co., Louisville. For the past three years he has been



REG ANDERSON

Appointed sales engineer for New York and New England, Threadwell Tap & Die Co., division of Sheffield Corp., Dayton, O. Noted in STEEL, Oct. 18 issue, p. 122

product manager of the Sheet Division at Louisville Plant No. 7.

—o—

C. J. Carter, formerly associated with the engineering department at Park Works, Crucible Steel Co. of America, Pittsburgh, has been appointed chief engineer of the Midland Works of the company.

—o—

George R. Milne has been appointed operating manager of National Carbide Corp., New York, subsidiary of Air Reduction Co. Inc. He joined the Air Reduction Sales Co. in 1934, transferring to National Carbide Corp. in 1941 at the Louisville plant, where in 1946 he assumed the position of works manager. He will continue to have headquarters at the Louisville plant. **Russell T. Lund,** plant superintendent at Louisville, has been appointed assistant operating manager of National Carbide Corp. For the present he will have headquarters at the corporation's Ivanhoe, Va., plant.

—o—

Columbian Carbon Co., New York, announces that **Robert M. Hillas** has been elected chairman of its board of directors, an office that has not been occupied in recent years. Mr. Hillas has been a member of the board for 15 years, and since 1940 has been a vice president. **Carl E. Kayser** has been elected president, to fill the vacancy caused by the recent death of **Reid L. Carr.** Mr. Kayser joined the company in 1946 as executive assistant to the president, and recently served as vice president. **T. R. Goebel** has been elected vice president, and will assume charge of a new office at Houston, Tex.

—o—

A. H. Behnke has been elected vice president in charge of materials, Hotpoint Inc., Chicago, subsidiary of General Electric Co. This department was created during the past year, and Mr. Behnke is the first company officer to head it.

—o—

Officers of the recently organized firm of Sayre Tool & Engineering Co., Sayre, Pa., are: President, **George Kohlhaas;** vice president, **J. A. Mitchell;** and secretary-treasurer, **Andrew Tremblay.**

—o—

J. V. Rogers has been appointed assistant chief engineer of Consolidated Mining & Smelting Co. of Canada, Toronto.

OBITUARIES . . .

Alexander C. de Lamoutte, 79, vice president, Ansco Division, General Aniline & Film Corp., New York, died Oct. 16 at his home in Garden City, L. I. He joined the division at the age of 14, when he came to this country from France. The division was then called Anthony Scoville Co., located at Binghamton, N. Y. Forty years ago the name was changed to the Ansco Corp.

—o—

Carl G. Swebilius, 68, founder in 1926 of High Standard Mfg. Co., a firearms concern, died Oct. 18 at his home in New Haven, Conn.

—o—

Daniel W. Mead, 86, engineer and professor emeritus of hydraulic and sanitary engineering, University of Wisconsin, died Oct. 12 at his home in Madison, Wis. For many years he was partner in the firm of Mead & Seastone, consulting engineers. During the time he served the university, Mr. Mead was also engaged as a consulting engineer.

—o—

Eugene T. Scott, 35, former sales manager, Templeton, Kenly & Co., Chicago, died recently at his home in Hinsdale, Ill.

—o—

William Timm, 80, president, Northern Structural & Boiler Works, Appleton, Wis., died Oct. 16.

—o—

B. E. Rodin, 48, an engineer for White Motor Co., Cleveland, died Oct. 17. He had been with the White organization since 1936, and previously was with Studebaker Corp.

—o—

Rex F. Nicholson, general sales manager, Algoma Steel Corp., Toronto, Canada, died recently in Quebec. He had been associated for 30 years with that concern.

—o—

Peter J. Needham, 66, for 35 years foreman of the rod mills, American Steel & Wire Co., at Waukegan, Ill., died Oct. 16.

—o—

Charles T. Hibner, 56, former works manager, Wrought Washer Mfg. Co., Milwaukee, and the Heil Co., that city, died Oct. 16. He resigned his position last June.

—o—

George C. Christopher, 90, founder, president, and partner in the firm of Geo. C. Christopher & Son Iron Works at Wichita, Kans., died recently.

—o—

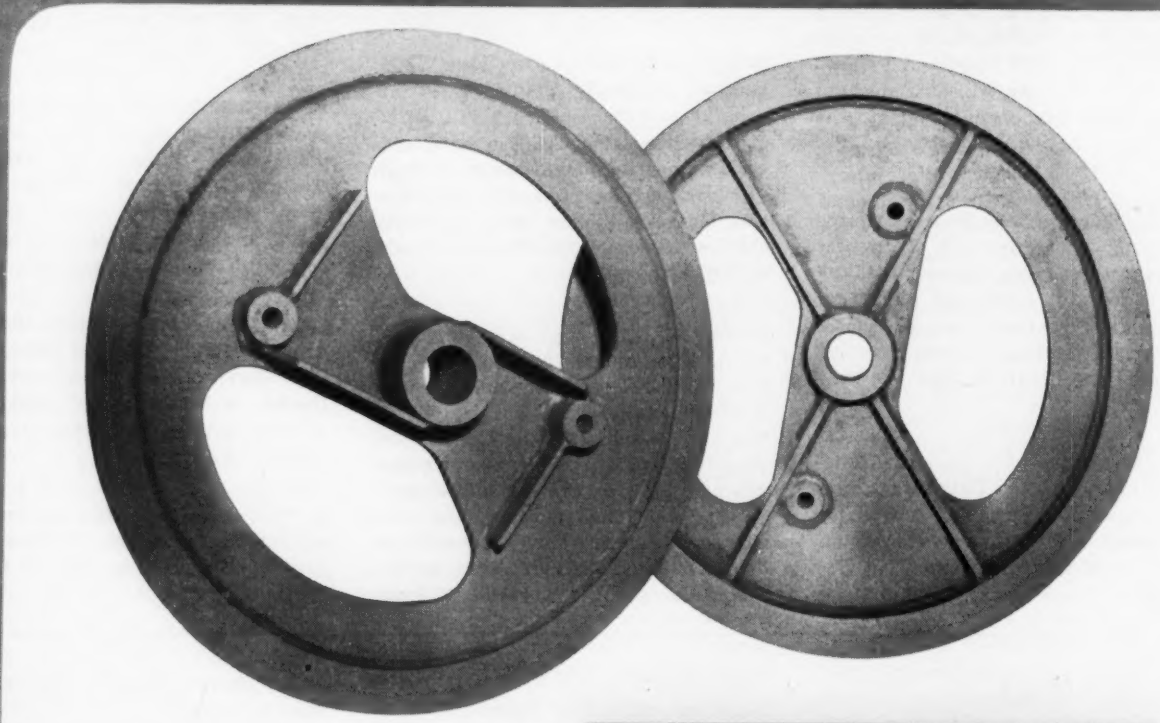
H. Albert Hansen, 63, an engineer with Bendix Aviation Corp., Detroit, and an authority on carburetors for marine motors, died Oct. 17.

Rugged Construction Machinery Uses
DESIGNED CIRCULAR WELDMENTS
by AMERICAN WELDING

● This specially designed weldment combines an arc welded center section of flame cut gussets and web (AISI-C-1020), hub and bosses (AISI-C-1030) and a flash-butt weld outer gear ring (AISI-C-1045) which is 24" O.D. x 21" I.D. x 2".

Manufacturers who have unusual welding jobs often call in American Welding for design and manufacturing suggestions. They know they receive the full benefit of 31 years of experience. They know also that their jobs are of the highest quality when manufactured by American Welding's Controlled Technique.

May we apply this experience to your product? An American Welding representative will be glad to call at your convenience.



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THE AMERICAN WELDING AND MANUFACTURING COMPANY

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Engineering News . . . AT A GLANCE

"PIN-WHEEL" FORMING— In forming spring leafs in the plant of Triangle Auto Spring Corp., DuBois, Pa., the leaves, following a press operation where center and clip holes are punched, are heated preparatory to forming and quenching in continuous walking beam or batch type furnaces. Large orders, however, are formed on a pin wheel type forming machine which also quenches each leaf as the wheel revolves. After quenching the leaves are dropped off cam-operated form to a conveyor that takes the leaves out of the quench tank to the drawing or tempering furnace.

CHANGE THAT PAID OFF— Change in method of fabricating a tertiary high-speed cluster gear used on Kearney & Trecker milling machines resulted in a cost reduction amounting to about 20 cents per piece, the Drop Forging Association, Cleveland, reports. Furthermore, the newer technique provides a driving member of considerably greater strength than formerly achieved. Gear design was changed to be produced as a forging primarily to obtain higher strength which results from directioning and positioning of inherent grain flow in the steel. Use of closed impression dies, also, contributed to lowering costs as the gear blank is drop forged to very close dimensions, greatly reducing machining time.

ANOTHER RESEARCH AID— Fluid flow, vibration and high-speed rotational and linear motion of various bodies now can be stopped with the photolight developed recently by General Electric Co., Schenectady, N. Y. Unit is said to enable users to catch objects moving in excess of 2700 feet per second. It produces sufficient light energy to obtain negatives of good quality when exposed at lens speeds of f6.3 or faster. Heart of the unit is a new 3-electrode, short gap, high-pressure inert gas-filled tube with self-contained, fixed-focus parabolic reflector.

STAINLESS HANDLES HIGH HEAT— Steam containers, such as throttle valves, steam chests and other high pressure parts of the 100,000 kilowatt turbine, recently shipped by Westinghouse for installation at the Sewaren generating station in New Jersey, are constructed of 18-8 stainless steel to withstand the terrific temperatures of steam fed into it. Steam pipes feeding the 3600 revolutions per minute, tandem compound double-flow machine glow a dull red as the 1050° F steam passes through them. The new turbine, first constructed for such operating conditions, is said to produce about 2500 kilowatt hours of electrical energy from each ton of coal burned.

SOLIDIFIES METAL UNDER PRESSURE— Secret centri-die British casting process developed by Firth-Vickers Stainless Steels Ltd., Sheffield, England, and recently acquired by Lebanon Steel Foundry, Lebanon, Pa., STEEL, Sept. 13, p. 73, relates to the casting of molten metals and alloys in heavily constructed molds while the latter are rotated at high speed about their axes. The molten metal is deposited and solidified under pressure within the mold, producing a symmetrical or cylindrical ring of high density with excellent structural properties throughout. Process is reported specifically adapted to production of high-melting-point alloys and steels ranging from the carbon steel grades to the new super-alloy types.

SHAPE GOVERNS EFFICIENCY— Factor to consider in designing parts specifically for economical deburring and finishing is the provision of a shape that will permit the processing media to reach all points equally to remove sharp edges or burrs. Where a part contains smoothly radiused edges throughout, it is pointed out, they can be maintained within relatively narrow limits. General radii range most practical is from 0.002 to 0.020-inch. Good practice in designing for finishing calls for keeping the part as small as possible. It is far better to make an assembly simple in shape than large and complicated in form. While such a principle is contrary to general manufacturing for cost reasons, it nevertheless holds true whenever finishing is paramount. (p. 68)

REQUIRES RAPID COOLING — Austenitic stainless alloys are heat treated by annealing at a room temperature high enough to effect carbide solution, but low enough to minimize grain growth. They are then cooled rapidly to room temperature to keep the carbides in solution. It is pointed out that during slow cooling a carbide precipitation occurs. These carbides, rich in chromium, precipitate at the grain boundaries. At the temperature where the precipitation occurs, chromium diffusion from the matrix is not rapid enough to replenish the chromium taken out of the immediate vicinity of the carbide. Consequently this region is low in chromium. Because chromium is the element largely responsible for corrosion resistance the region next to the carbide becomes lower in resistance and the material is susceptible to intergranular corrosion. (p. 71)

KNOWLEDGE AIDS WORKMANSHIP—Forging metals are available in a great variety of compositions. These vary from each other with each alloy designed to serve some specific purpose a little better than any of the other compositions. According to Waldemar Naujoks, a small working knowledge of forging metals should help in understanding some of the problems entailed in their fabrication and use. Even as good lumber can be spoiled by poor workmanship, so can the good qualities in a metal composition be lessened by improper forging practice. (p. 78).

Precision Tumbling Processes Improve Finishing

By C. HEAMON CASTLE
Technical Director
Sturgis Products Co.
Sturgis, Mich.

Basic production economies can be effected by good product design combined with mechanical barrel-finishing techniques, using special chips and compounds for grinding, deburring, polishing and coloring

Fig. 1 — Use of electric overhead hoist and swivel-type hoist pan simplifies and speeds loading of parts into equipment for grinding, deburring, polishing, britehoning and coloring operations

Fig. 2—From a design - for - finishing standpoint, this group of diecast levers may be evaluated as indicated

g Efficiency

FOLLOWING directly on the heels of numerous and varied wartime engineering developments and refinements in both materials and manufacturing methods, product design programs have been launched in hundreds of metalworking plants the nation over during the past couple years. Better product performance, greater serviceability, lower production costs, standardization of parts, added "buy-appeal," lower selling prices—these factors, among others, account principally for the tremendous upsurge in product redesign since the end of the war.

In designing metal parts to be ground and deburred, britehoned or colored by a precision-tumbling process, several factors deserve consideration by product designers and development engineers. Simplicity is the initial requisite. Parts most adaptable for barrel-finishing are free of sharp corners, flat surfaces and recessed areas as these elements complicate the production of consistently effective mechanically-finished surfaces. Flat surfaces frequently can be minimized by blending them with curves. By this means, the finishing problems that are brought about by sharp angular designs also are materially lessened.

A second main consideration in designing parts specifically for economical deburring and finishing is the provision of a design of such shape that will permit processing media to reach all points equally to remove sharp edges or burrs. Where a part contains smoothly radiused edges throughout, they can be maintained within relatively narrow limits. General radii range that is most practical is from 0.002 to 0.020-inch.

Small parts particularly have proved best adapted to tumbling. Good practice in designing for finishing calls for keeping the part as small as possible. It is far better to make the piece an assembly simple in shape than a single large part of complicated or complex form. While this principle is contrary to general manufacturing practice for cost reasons, it nevertheless holds true whenever finishing is of paramount importance from the viewpoint of the designer.

Still another prerequisite of good parts design for mechanical finishing is to achieve proper balance. By that is meant the avoidance of "lopsidedness" whereby one section or end of the part is considerably heavier or larger than its opposite.

In addition, continuity of curved surfaces should be broken up whenever possible by lines, fluting, or by incorporating a simple design pattern of some sort. Use of this device tends to hide surface imperfections to a certain degree. Generous use of fillets in corners likewise is becoming increasingly recognized as good designing-for-finishing practice as this tends to simplify the finishing problem.

Equipment—In any mechanical finishing operation, equipment plays a vital role in the results secured and the costs involved. Generally speaking, there are two basic types of barrels in common present-day usage. One is the so-called "high, narrow compartment" type of large diameter; the other is of long width or length, having a small diameter.

The greater portion of barrel-finishing today is performed in high, narrow units, which have been redesigned in recent years to incorporate a number of basic improvements. These include a welded structure, more rigid frame, mounting of motor directly on the machine, easier and more positive control, safety guard surrounding the entire unit and a steel separating bulkhead between compartments. Materials handling efficiency has been improved with overhead hoist pans. Relining barrels without taking the ends off has been made feasible, too.

These and other important equipment improvements, which reflect the remarkably rapid technological strides made recently in the art of barrel-finishing, are significant. As a result of them, the economies and efficiencies inherent in this long-practiced technique have been further increased by making it entirely practical to control, scientifically, operating variables without making the mechanical finishing routine technically cumbersome.

Barrel-finishing—One typical, outstanding example is Roto-Finish, a series of processes having individual or collective application to deburr, grind, or produce surface improvement mechanically. Developed by Sturgis Products Co., Sturgis, Mich., these processes are:

1. Grinding and deburring, using specially prepared grinding chips; 2. polishing, using specially prepared britehoning chips; 3. britehoning, employing britehoning chips, which also are specially prepared for their particular application; 4. coloring, utilizing hardened, highly polished, steel balls or other highly polished steel coloring media.

While conventional tumbling or so-called "rattling" equipment is suitable with certain revisions, octagonal-shaped barrels, 32 inches in diameter and varying in length from 24 to 60 inches, are generally used. Processing cylinder, suspended horizontally in a rigid frame, is rotated with a chain drive which connects the cylinder to a motor-driven gear reducer.

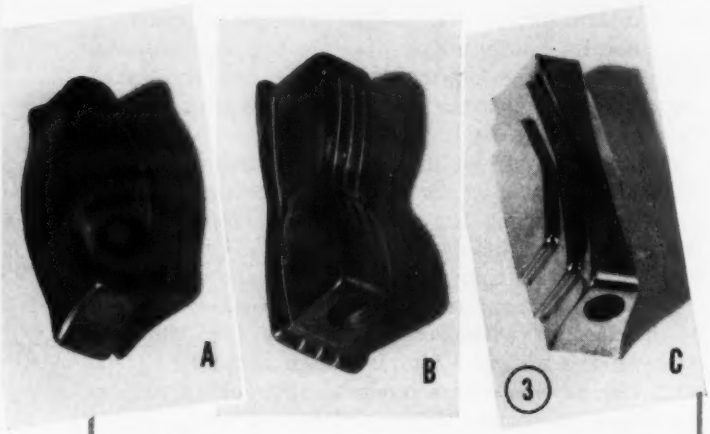

Fig. 3—Three zinc base die castings used to house mechanism for tightening drum heads. Item A represents fairly good design for mechanical finishing; B—just passable; C— poor design for finishing, mechanical or otherwise

Cylinder is made up of one or more compartments, which are lined with wood and equipped with a lightweight cam-locking door.

Each process—grinding and deburring, britehoning, coloring—consists chiefly of charging the processing compartment with parts, mineral chips, recommended chemical compound and water in exact proportions as predetermined by tests, and then rotating the entire mass at a set speed (also predetermined). Parts are processed in this manner until desired degree of surface finish is obtained.

Controlled Abrasion—Grinding or deburring is produced by the controlled abrasive action of the chip mass as it works on exposed edges and surfaces. Pressure exerted by weight of processing mass, coupled with the action that develops with the generating motion of the chip mass, largely determines the quality and consistency of finishing results attained. And because these determinants are definitely controllable within precise limits, there is no banging or nicking of parts as is so commonly associated with ordinary rattling or tumbling methods.

Chip size likewise is an important consideration. Large chips cut faster and abrade easier than small ones. That is because the mass or weight of the individual chip and the force behind its surface contact is greater in the case of large chips. Conversely, small chips produce a finer finish; the force behind their surface contacts is less in relation to their individual mass.

When finishing metal parts with mineral chips by these techniques, the most exposed portions of the piece are abraded or finished first. General sequence of finishing different areas is: Corners, edges, convex surfaces, flat surfaces, concave surfaces, and deeply recessed or unexposed areas.

This controlled continuous-rotation grinding process is applicable to practically any ferrous or nonferrous metal or alloy—castings, forgings, extrusions, spinnings, accurately machined parts—ranging in size from the tiniest pieces weighing but a fraction of an ounce up to intricately-shaped items of as much as 75 pounds each. Capable of removing sharp edges or burrs and rough surface irregularities, it proves practical whenever deburring or metal removal is the principal reason for processing. Nonmetallic parts also may have an application, particularly if the part in question is of the functional type rather than one having decorative requirements.

As a mass-production process, this type of grinding for deburring has become increasingly valuable from both quality and cost standpoints. During the war, one of the nation's prime aircraft producers slashed deburring time and labor by 65 per cent. A prominent home appliance manufacturer reports: "The process opens up a new field in industry, and furnishes an opportunity for the manufacturer to turn out a satisfactory finish at a fraction of the cost involved in hand labor." One mid-western manufacturer of automotive parts and plumbing hardware states that removal of rough and sharp edges and improvement of the surface of diecast parts prior to chrome plating is accomplished in 40 per cent less time in comparison to previously utilized hand methods. Some 12,000 parts are now handled in 5 hours by a single operator against the former high of 1000 pieces per hour per operator.

Through its controlled rotary action and the use of special chips and compounds, the technique provides continually repetitive production uniformity unobtainable with commonly-used hand-finishing methods. Finish to the same degree is obtained on parts of one run or many as the action can be regulated from severe cutting to fine finishing, enabling critical and close tolerance specifications to be maintained with a remarkable degree of accuracy, uniformity and consistency.

Polishing—Polishing is a procedure requiring the use of britehoning chips as a processing media together with Roto-Finish compounds. It is used for removing light burrs, sharp edges and corners from steel, brass and aluminum stampings. The same parts as well as die castings should also be prepared for britehoning using this procedure to remove surface irregularities. Sand castings which have been preliminarily ground to remove surface roundness are further prepared for britehoning by polishing to remove the irregularities not removed or which are residual from the grinding operation.

Polishing is most often used directly in conjunction with the britehoning operation for preparing parts and chips for this operation. All metal subsequently britehoned is usually given at least a short polishing operation prior to its actually being britehoned. Result of polishing is usually a smooth finish but is not lustrous until after britehoning. Harder metals usually show greater luster than softer metals, but likewise require longer processing cycles.

Honing—Britehoning, a further refinement of the basic continuous-rotation tumbling process finds its greatest use in the production of a semilustrous, smooth surface finish in preparation for electroplating, anodizing, painting, or further finishing by the coloring process. Chips employed for britehoning are less abrasive than those used in deburring.

Coloring — Fourth major application process is coloring, which is an extremely fine operation utilizing highly polished steel balls, (*Please turn to Page* 94)

Stainless Steels

—Their Characteristics

BY JAMES J. HEGER
Research & Technology Department
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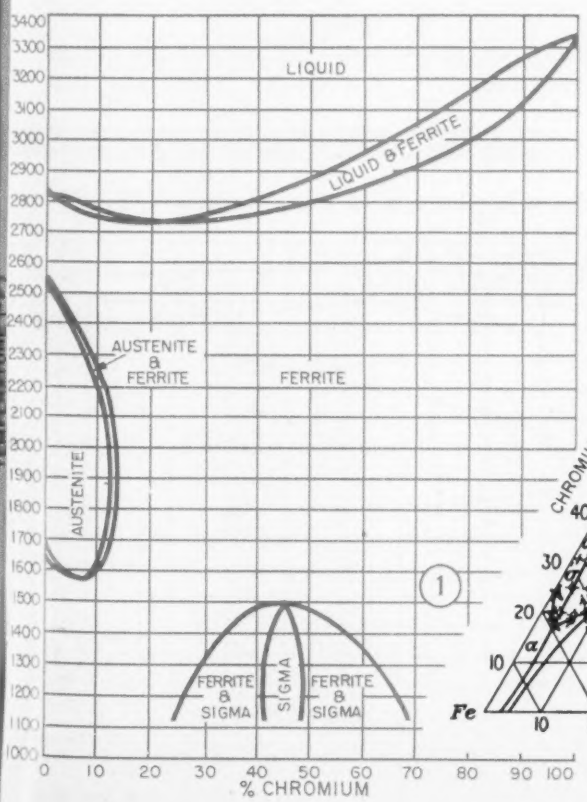
In describing the advantages of stainless steels, the author points out that chromium content seems to be the controlling variable in regard to corrosion resistance—that its effect may be enhanced by additions of molybdenum, nickel and other elements. Best impact properties at low temperatures and best strength at high temperatures are possessed by austenitic stainless while martensitic steels possess highest hardness

SUPERIOR corrosion resistance of stainless steels is brought by additions of chromium to alloys of iron or carbon. Although other elements such as copper, aluminum and silicon also increase the corrosion resistance of steel, they are limited in their usefulness and discussion will be limited to the alloys iron-chromium and iron-nickel-chromium.

Minimum amount of chromium necessary to render steel stainless depends upon the corroding agent used as a criterion, and undoubtedly one could pick an agent which would make 3, 12 or 99 per cent chromium as the minimum amount. American Iron & Steel Institute has chosen 4 per cent chromium as the dividing line between alloys and stainless steel. Standard types of stainless steels listed by the institute are shown in Table I.

In 1912 Harry Brearley, head of Brown-Firth Research Laboratory in England, while attempting to develop steels to resist fouling and corrosion encountered in gun barrels, reported that a composition of 12.8 per cent chromium and 0.24 per cent carbon was quite resistant to corrosion and suggested that this composition be used for cutlery. Our present cutlery steel, AISI Type 420 (12/14 per cent



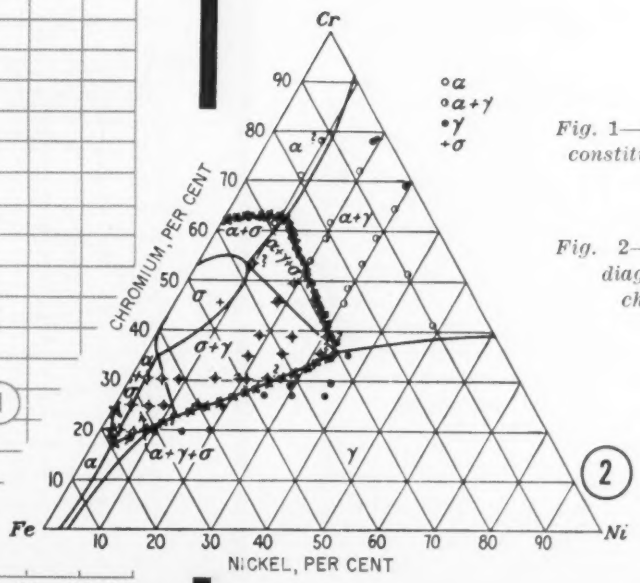


Fig. 1—Iron chromium constitution diagram

Fig. 2—Iron-chromium-nickel diagram at constant chromium content

Stainless Steels

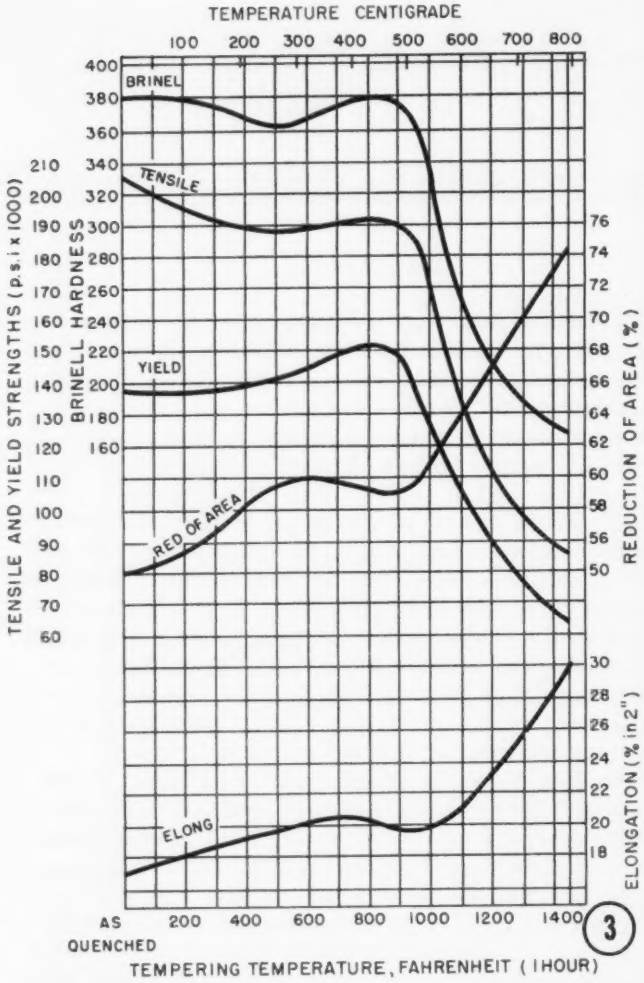


Fig. 3—Mechanical properties of quenched type 410 stainless as influenced by tempering temperature

chromium, over 0.15 per cent carbon), is similar to the alloy suggested by Brearley.

American Research—Development of the higher chromium-iron alloys was due to the work of F. M. Becket in the United States who, from 1903 on, was continuously attacking the problem of producing low carbon ferrochrome from chrome ores. While investigating the effect of chromium on oxidation resistance at 2000° F, Becket noted a marked increase in resistance as the chromium content was raised above 20 per cent. It is significant that even now and with alloys containing appreciable quantities of nickel, 20 per cent seems to be the minimum amount of chromium necessary for oxidation resistance at 2000° F.

Austenitic iron-chromium-nickel alloys were developed in Germany during the years 1909-1912 by Benno Strauss and Edward Maurer while searching for materials to be used in pyrometer tubes. Further work by Strauss and others ultimately led to the versatile 18-8 alloys which are so popular today.

Iron-Chromium System—At the present time, the iron-chromium diagram is known only on a semi-quantitative basis. Fig. 1 is a compromise diagram based on the work of many investigators.[1] Difficulties of establishing a precise equilibrium diagram are primarily due to two causes:

1. The difficulty of preparing pure alloys of iron and chromium. (Nitrogen and carbon seem to be the chief impurities.)
2. The sluggishness of the iron-chromium alloys to respond to heat treatment.
(Reaction rates in carbon steel are a matter of minutes and seconds whereas thousands of hours are required to complete transformations at some temperatures in chromium-iron alloys.)

First difficulty is relatively unimportant because melting practices have improved and purer alloys may be expected. However, the second difficulty often may be overlooked and thus lead to false conclusions.

High temperature portion of diagram is based on data of Adcock reported in 1931.[2] Adcock's data were accepted because of the high purity of his alloys and the techniques he employed.

Gamma Loop Discovered—Existence of the gamma loop was discovered in 1926 by Bain[3] who also

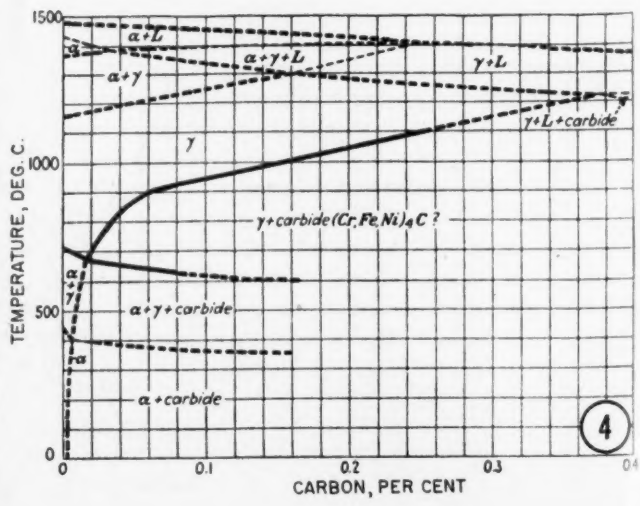


Fig. 4—Effect of carbon on constitution of alloys containing 18 per cent chromium and 8 per cent nickel

Stainless Facts

According to a survey conducted by STEEL'S market research department, production of stainless steel, doubled since 1940, is now 330 per cent above 10 years ago. One out of 8 tons of alloy steel produced is now stainless.

Producers of automobiles, domestic appliances, machinery and industrial equipment are the largest users. Nearly half the stainless consumers are located in Ohio, Indiana, Illinois, Michigan and Wisconsin. About 24 per cent of the total tonnage is sold through warehouses. Of the 10,505 plants using stainless, 53 per cent buy from warehouses, 25 per cent from both mills and warehouses and 22 per cent from mills only.

Cold finished bar is the most widely used product, with nearly 40 per cent of all plants using it. In second place is cold rolled sheet, 36 per cent. Cold rolled strip is third, 30 per cent, but in 1947 it accounted for the greatest tonnage, 101,288 net tons being produced.

Of all plants, 26.4 per cent expect to expand their purchases of stainless. Only 6.2 per cent contemplate using less. Southern and western states foresee the most rapid expansion in use of stainless, although the midwestern states will remain the largest consuming area. Of plants using hot rolled stainless steel sheet, 30.71 per cent expect to expand their consumption of this product. Rate of expected expansion on other products ranges from 18.02 per cent on wire to 33.84 per cent on plate.

Most uses of stainless are on a permanent basis. Only 5.6 per cent of all plants—and less than 1 per cent of the large plants—are using stainless as a temporary substitute due to shortage of other grades of steel.

showed the effect of higher carbon contents on increasing the austenite field. The intermetallic compound, sigma phase, was discovered in 1927 by Bain and Griffiths.[4]

These two regions were extensively studied by other investigators and their data differed widely. This difference was especially marked for the sigma region. The most careful investigation, that of Adcock, who used the purest alloys of all, failed to detect the phase and Adcock came to the conclusion that the phase did not exist.

Effect of Too Pure Alloys—However, the evidence of other investigators was overwhelmingly in favor of the existence of sigma phase. In 1936, Jette and Foote,[5] using alloys similar in purity to those of Adcock, were able to produce and identify sigma phase. Surprisingly enough, when they used treatments similar to those of Adcock, no sigma phase was formed. They concluded that Adcock's alloys were too pure and too well annealed for transformation to take place in the time allowed. Finally, the entire matter was conclusively settled in 1943 by Cook and Jones[6] who, using Adcock's original alloys and longer transformation times, reported the sigma limit as shown. Boundary lines as shown by Cook and Jones are based on x-ray data but may still be questioned because equilibrium may not have been obtained and longer annealing times may widen the alpha + sigma region.

Diagram itself shows that as the chromium content increases, the austenite region is decreased until above 12.5 per cent chromium austenite no longer exists. After normal heat treatment, alloys above this chromium content consist entirely of a single phase—alpha, but as shown, sigma phase is stable and will form after long times at temperatures above 900° F and below the upper limit.

Very little is known quantitatively about the effect of impurities upon this diagram. Bain[3] has reported on the effect of carbon on the gamma loop. Anderson and Jette[7] reported that silicon increases the sigma region. Bain and Aborn[8] reported that nickel also increases the sigma region.

Iron-Chromium-Nickel System — Like the iron-chromium system, the iron-chromium-nickel system is known only semi-quantitatively but the existing diagrams are useful for interpretation of what otherwise would be mysterious behavior. Likewise, the investigation of this system has been hampered by slow reaction rates.

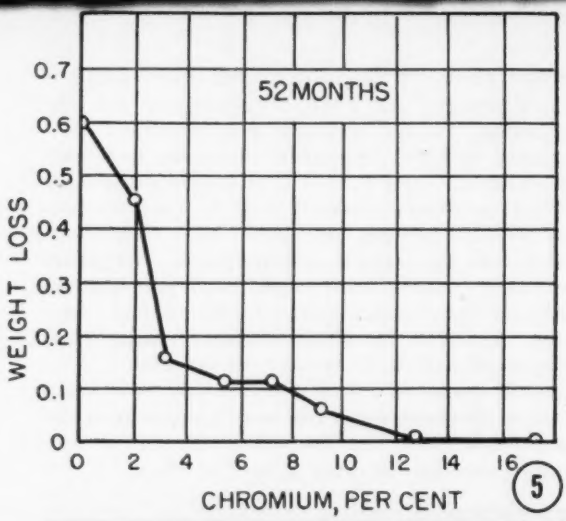
First investigation of the iron-chromium-nickel system was conducted in 1909-1912 by Strauss[9] who

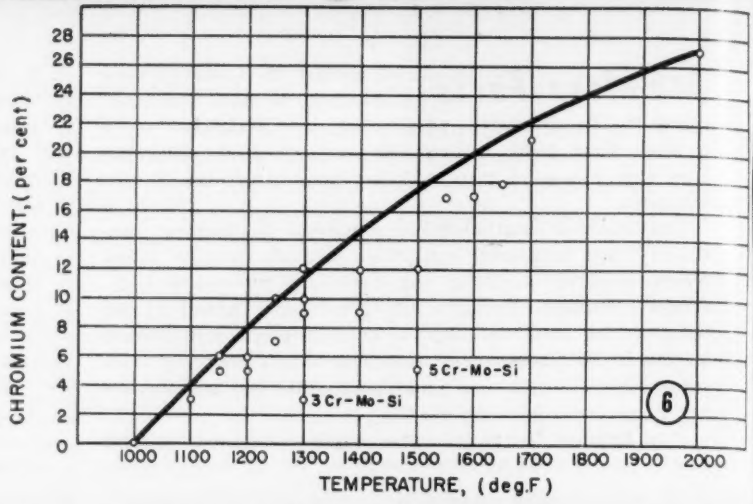
TABLE I

AMERICAN IRON AND STEEL INSTITUTE STANDARD TYPE NUMBERS, CHEMICAL COMPOSITION LIMITS AND RANGES

Chemical Composition, Per Cent

Type Number	C	Mn Max.	Si Max.	P Max.	S Max.	Cr	Ni	Other Elements
301	Over 0.08/0.15	2.00	1.00	0.040	0.030	16.00/18.00	6.00/8.00	.....
302	Over 0.08/0.15	2.00	1.00	0.040	0.030	17.00/19.00	8.00/10.00	.....
302B	Over 0.08/0.15	2.00	2.00/3.00	0.040	0.030	17.00/19.00	8.00/10.00	.....
303	0.15 Max.	2.00	1.00	....	....	17.00/19.00	8.00/10.00	P, S, Se Min. 0.07, Zr, Mo Max. 0.60
304	0.08 Max.	2.00	1.00	0.040	0.030	18.00/20.00	8.00/11.00	.....
308	0.08 Max.	2.00	1.00	0.040	0.030	19.00/21.00	10.00/12.00	.....
309	0.20 Max.	2.00	1.00	0.040	0.030	22.00/24.00	12.00/15.00	.....
310	0.25 Max.	2.00	1.50	0.040	0.030	24.00/26.00	19.00/22.00	.....
316	0.10 Max.	2.00	1.00	0.040	0.030	16.00/18.00	10.00/14.00	Mo 1.75/2.75
321	0.10 Max.	2.00	1.00	0.040	0.030	17.00/19.00	8.00/11.00	Ti 5xC Min.
347	0.10 Max.	2.00	1.00	0.040	0.030	17.00/19.00	9.00/12.00	Cb 10xC Min.
403	0.15 Max.	1.00	0.50	0.040	0.030	11.50/13.00	.....	Turbine Quality
405	0.08 Max.	1.00	1.00	0.040	0.030	11.50/13.50	.....	Al 0.10/0.30
406	0.15 Max.	1.00	1.00	0.040	0.030	12.00/14.00	.....	Al 3.50/4.50
410	0.15 Max.	1.00	1.00	0.040	0.030	11.50/13.50	.....	.....
414	0.15 Max.	1.00	1.00	0.040	0.030	11.50/13.50	1.25/2.50	.....
416	0.15 Max.	1.25	1.00	....	....	12.00/14.00	.....	P, S, Se Min. 0.07, Zr, Mo Max. 0.60
420	Over 0.15	1.00	1.00	0.040	0.030	12.00/14.00	.....	.....
430	0.12 Max.	1.00	1.00	0.040	0.030	14.00/18.00	.....	.....
430F	0.12 Max.	1.00	1.00	....	....	14.00/18.00	.....	P, S, Se Min. 0.07, Zr, Mo Max. 0.60
431	0.20 Max.	1.00	1.00	0.040	0.030	15.00/17.00	1.25/2.50	.....
440A	0.60/0.75	1.00	1.00	0.040	0.030	16.00/18.00	.....	Mo 0.75 Max.
440B	0.75/0.95	1.00	1.00	0.040	0.030	16.00/18.00	.....	Mo 0.75 Max.
440C	0.95/1.20	1.00	1.00	0.040	0.030	16.00/18.00	.....	Mo 0.75 Max.
442	0.25 Max.	1.00	1.00	0.040	0.030	18.00/23.00	.....	.....
443	0.20 Max.	1.00	1.00	0.040	0.030	18.00/23.00	.....	0.90/1.25 Cu
446	0.35 Max.	1.00	1.00	0.040	0.030	23.00/27.00	.....	N_2 0.25 Max.
501	Over 0.10	1.00	1.00	0.040	0.030	4.00/6.00	.....	.....
502	0.10 Max.	1.00	1.00	0.040	0.030	4.00/6.00	.....	.....





Stainless Steels

studied the iron-rich corner. He found that the alloy 20 per cent chromium-7 per cent nickel contained free carbide which could be dissolved at 2280° F and retained in solution at room temperature by rapid cooling. He also noted a grain boundary precipitation at 1290° F.

Bain and Griffiths were the first to report sigma phase and they noted that nickel raised the upper temperature limit of this phase. Bain and Aborn[8] made a comprehensive review of the iron-chromium-nickel system.

Work of the Germans in this field has been very extensive. Fig. 2 shows an isothermal section at 650° C (1202° F) based on the data of Schafmeister and Ergang.[10] The area in which sigma phase occurs is shown in heavy outline.

Commercial Heat Treatments—From 5 to 12 per cent chromium, using 0.15 per cent carbon as a base, the alloys are hardenable by the austenite to martensite transformation. As would be expected from the high chromium contents, hardenability of these alloys is good and increases with increasing chromium and carbon.

However, most of the applications for the 5 to 9 per cent chromium steels require the metal to be in the most ductile condition, and the "softening" practice employed consists of normalizing and tempering, or one of the various annealing cycles. Ductility is required because these alloys are subjected to various fabrication practices such as bending, cold flanging, and cold upsetting before they are placed in service.

These alloys all contain a minimum of 0.5 per cent molybdenum, originally added to reduce temper brittleness. Fortunately, the molybdenum was found to be quite effective for increasing the elevated temperature strength and even if temper brittleness did not occur, these additions could be justified on elevated temperature strength alone.

Welding Treatment—Because these alloys are air hardenable, welding must be performed with the necessary precautions such as pre- and post-heating. Often in field welding these precautions cannot be observed and, when this situation is anticipated, stabilization with titanium or columbium may be employed. Titanium and columbium form stable carbides and in effect, the material behaves like a low carbon alloy and has lower hardness than material without stabilizing elements. Improvements in melting practices have led to the development of extremely low carbon alloys which, theoretically, should not harden after welding.

Depending upon the intended application, the 12 per cent chromium alloys are used in fully hardened as well as the annealed condition. These materials may be either air cooled or oil quenched from the hardening temperature. Oil quenching produces slightly higher hardnesses but air cooling is employed in order to minimize the danger of cracking.

Fig. 3[11] shows the effect of tempering temperature on the hardness and tensile properties of type 410 (12 per cent chromium-0.10 per cent carbon). Impact strength decreases in the range 750-950° F, also maximum corrosion resistance is not obtained in the range 1000-1200° F. Hence, the range 750-1200° F is to be avoided. Heating below 750° F is commonly called stress relieving, while heating above 1200° F is called tempering. Annealing is usually accomplished by heating above the lower critical temperature and slow cooling.

As was true for the lower chromium steels, the 12 per cent chromium steels must be welded with caution because of weld hardening. Hardenability of the 12 per cent chromium steels is lowered by small additions of aluminum (0.3 per cent). These are sufficient to eliminate austenite and make the alloy ferritic at all temperatures so that no phase transformation and consequently no hardening occurs.

Ferritic Steels—Higher chromium steels (17 per cent chromium, high carbon excepted) are completely ferritic. Annealing would then seem to be a simple process of heating at a recommended temperature for a reasonable time and slow cooling. However, two difficulties arise. First, because the alloys are single phase, no grain refinement by means of a phase transformation is possible and a large grain size once formed by improper heating procedure will be retained on cooling to room temperature. Only by cold work and recrystallization can the grain size be reduced. The fact that the high chromium alloys

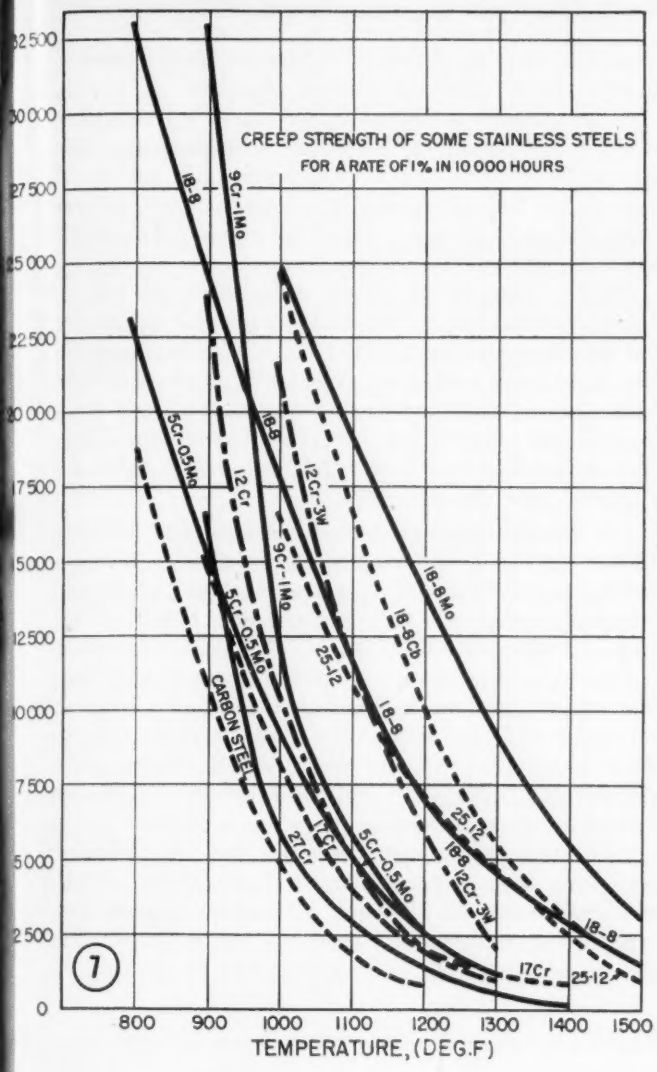


Fig. 5—Influence of chromium on atmospheric corrosion of low carbon steel

Fig. 6—Maximum amount of chromium necessary for freedom from scaling at temperatures from 1000 to 2000°F

Fig. 7—Creep strength of some stainless steels

are inherently notch sensitive makes the effect of grain coarsening even worse. Additions of nitrogen have been used to obtain a finer grain size. Apparently, chromium nitrides form and thereby inhibit grain growth.

Second difficulty is that when the alloys are heated in or slowly cooled through the temperature range 600-1400° F, embrittlement occurs. As yet no conclusive evidence has been produced to show the cause for the embrittlement, but it is believed that the embrittlement is caused by the precipitation of a chromium-iron compound, probably associated with sigma phase. Keeping in mind the grain growth and embrittlement, the high chromium alloys are annealed by heating in the range 1400-1700° F and cooling rapidly.

Iron-Chromium-Nickel Alloys — Austenitic steels are also usually considered to be single phase although this belief is erroneous for two reasons. First, in ordinary 18-8, austenite is not thermodynamically stable at room temperature. By the mechanical means of plastic deformation at room temperature, meta-stable austenite can be transformed, at least partially, to martensite. Furthermore, additions of aluminum and titanium in sufficient quantities cause the 18-8 alloy to transform to a low-carbon martensite without benefit of cold work. This effect has been used advantageously (*Please turn to Page* 90)

TABLE II

Laboratory Corrosion Data Showing Resistance of USS Stainless Steels to Various Chemicals and Acids

Fully Resistant	A	Less than 0.00035 inches penetration per month
Satisfactorily Resistant	B	0.00035-0.0035 inches penetration per month
Fairly Resistant	C	0.0035-0.010 inches penetration per month
Slightly Resistant ...	D	0.010-0.035 inches penetration per month
Not Resistant	E	Over 0.035 inches penetration per month

Substance	Condition	Temp. °F.	USS 18-8	USS 18-8 Mo	USS 17	USS 12
Acetic Acid						
5%	Agitated	70	A	A	A	A
5%	Aerated	70	A	A	A	A
10%	Agitated	70	A	A	A	A
10%	Aerated	70	A	A	A	A
20%	Agitated	70	A	A	A	C
•	•	•	•	•		
100% at 150 lbs. Pressure		400	E	C	..	..

TABLE III

MECHANICAL PROPERTIES OF TYPE 410

Form and Treatment	Tensile Strength, psi	Yield Strength (offset: 0.2 per cent), psi	Elongation in 2 in., per cent	Reduction of area per cent	Impact Resistance ft.-lb. Izod	Brinell Hardness
Bars:						
Annealed	75,000	40,000	30	75	90	150
Cold drawn 20 per cent	105,000	90,000	20	60	..	220
Oil Quenched fr. 1800 deg. F. and tempered at						
400 deg. F.	190,000	140,000	15	60	35	375
800 deg. F.	190,000	145,000	15	60	30	375
1200 deg. F.	115,000	80,000	23	70	85	212
1400 deg. F.	90,000	60,000	28	75	105	183
Mechanical Properties of Type 430						
Bars:						
Annealed	75,000	40,000	35	60	..	160
Cold drawn 20 per cent	92,000	.....	15	45	..	190
Mechanical Properties of Type 301						
Sheet:						
Annealed	110,000	40,000	60			
Cold rolled						
¼ Hard	125,000 min.	75,000 min.	25 min.			
½ Hard	150,000 min.	110,000 min.	15 to 18* min.			
¾ Hard	175,000 min.	135,000 min.	10 to 12* min.			
Hard	185,000 min.	140,000 min.	8 to 9* min.			

* Minimum elongation values vary with thickness, being higher with greater thickness.

TABLE IV

Typical Ranges of Tensile and Hardness Properties of Stainless W As Solution Annealed and As Aged at the Temperatures Indicated

Item No.	Treatment	Yield Strength 0.2% offset 1000 psi	Tensile Strength 1000 psi	Elongation in 2", % for Thicknesses Indicated: Plates and Bars ½" and less	over ½"	Rockwell Hardness "C" Scale
1	Solution Annealed at 1850 to 1950° F A.C.	75-115	120-150	8-14	10-15	22-28
2	No. 1 plus Aged at 950° F, ½ hr. A.C.	180-210	195-225	8-14	10-15	39-47
3	No. 1 plus Aged at 1000° F, ½ hr. A.C.	170-210	190-220	8-14	10-15	38-46
4	No. 1 plus Aged at 1050° F, ½ hr. A.C.	150-185	170-210	8-15	10-16	35-43

Seen and Heard in the Machinery Field

By GUY HUBBARD
Machine Tool Editor

WORLD'S BEST INVESTMENT: I was on the verge of taking off for Atlantic City to attend the 47th annual meeting of the National Machine Tool Builders' Association—on which I report elsewhere in this issue—when I had a telephone call from Mrs. Frida F. Selbert, secretary of that association, telling me about something which should be of great interest and value to directors of metalworking companies.

This "something" is a 12-page booklet published by the association for release at the time of the Atlantic City meeting. It is entitled "The World's Best Investment". Its cover aptly is a reproduction of a typical "financial page" of a newspaper.

Here is the thinking fostered by this booklet, as expressed in its introduction: "Just as the study of what present stocks can be sold for—and which stocks could be bought to advantage—enables you to strengthen your portfolio, so also does a study of what your present machines can be sold for—and what modern machines will earn in their place—enable you to strengthen your shop.

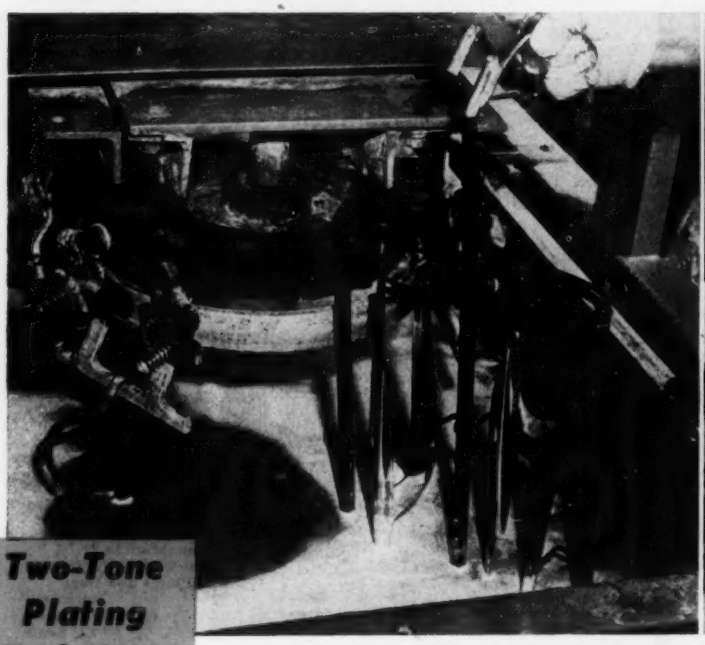
"If a security is selling at ten times its earnings, you are interested in it. When a modern machine tool will pay for itself in ten years, it is selling at a price ten times its earnings. Machine tool builders constantly are finding cases where a replacement will pay for itself in even less time.

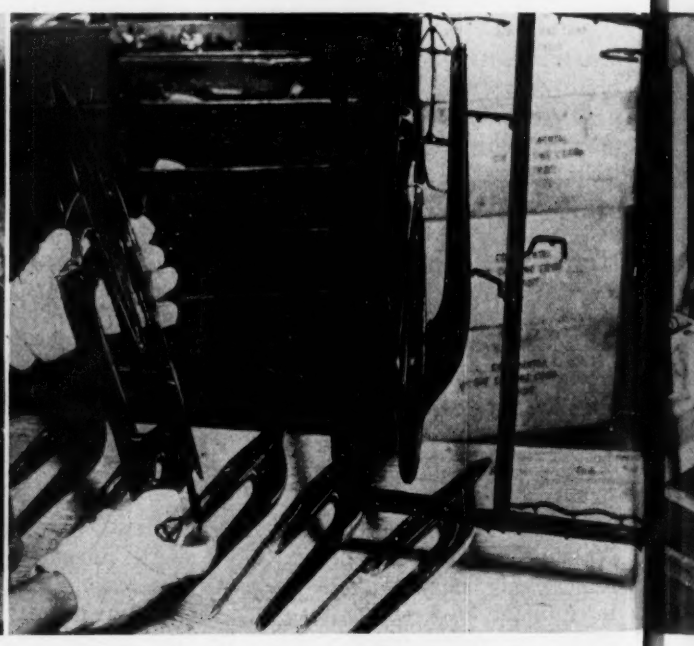
"Alert management should take keen interest in earnings that can be made by careful analysis of the 'machine tool portfolio'. When a plant improves its output per manhour, everybody gains—management, labor, stockholders and customers. This message is not directed to large establishments alone. Any shop, no matter how small, can easily check its machine tool investments."

The booklet then goes on to answer the question "When should a machine tool be replaced?" by analyzing the elements of replacement costs and annual operating charges. Then come some practical examples "right out of the shop" of a general purpose machine paying a return of 16.8 per cent per annum; of a turret lathe returning 26 per cent; of a grinder returning 62.5 per cent; of a multiple spindle automatic returning 43.7 per cent; of an engine lathe returning 112 per cent; and of a group installation returning 64 per cent.

As I study these case histories, and the formulas by which they were developed, I recognize several as those presented by some of America's most successful and hard-headed machine tool users at the Machine Tool Sales Refresher Course at Cornell.

Two-Tone Plating Technique





This view shows copper and nickel plating stage in the first successful method of both gold and chromium plating on a single piece of die cast metal developed recently by Continental Die Casting Corp., division, F. L. Jacobs Co. Several automotive hood ornaments are here being immersed after coming through the polishing and buffing machines . . . . . metal masks, held securely in place by wire, are bridged across the area of the hood ornament which later is gold plated. Masks protect this area while the rest of the ornament—consisting of a cigar-shaped center piece flanked by two wing pieces—is being chrome plated. About one-fourth of the top surface of the 20-inch casting is gold plated, while remaining is covered with chromium . . . .

I strongly recommend that you get this book and follow the methods outlined to check your own machines. Can you afford to mark time while your competition invests in more productive equipment?

AMERICAN NICKELOID'S FIFTIETH: It is with particular gratification that I have just received the following characteristically terse note from my good friend, Carl C. Struever, general manager, American Nickeloid Co., Peru, Ill.: "I thought you might like to look over our little anniversary booklet".

The booklet to which Carl refers is entitled "Fiftieth Anniversary of Nickeloid Metals". The story begins thusly: "About the time that Teddy Roosevelt was storming San Juan Hill, the American Nickeloid Co. was born. Peru, Ill., was Zinc Town, America, but sheet zinc was not very beautiful.

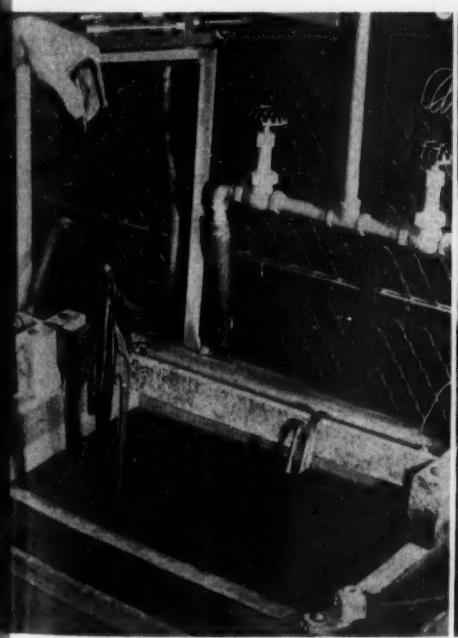
"In a 'factory' not much bigger than a two-car garage, workmen developed a method for plating zinc sheets with coatings of nickel. As so often is the case, these men essentially were technicians—not financiers, not salesmen, not businessmen.

"Five years after this founding, W. H. Maze, R. F. Struever and S. Pilson took over a controlling interest and active management. Two years later, in 1907, R. F. Struever became active general manager. Thus began the history of this bustling, growing company."

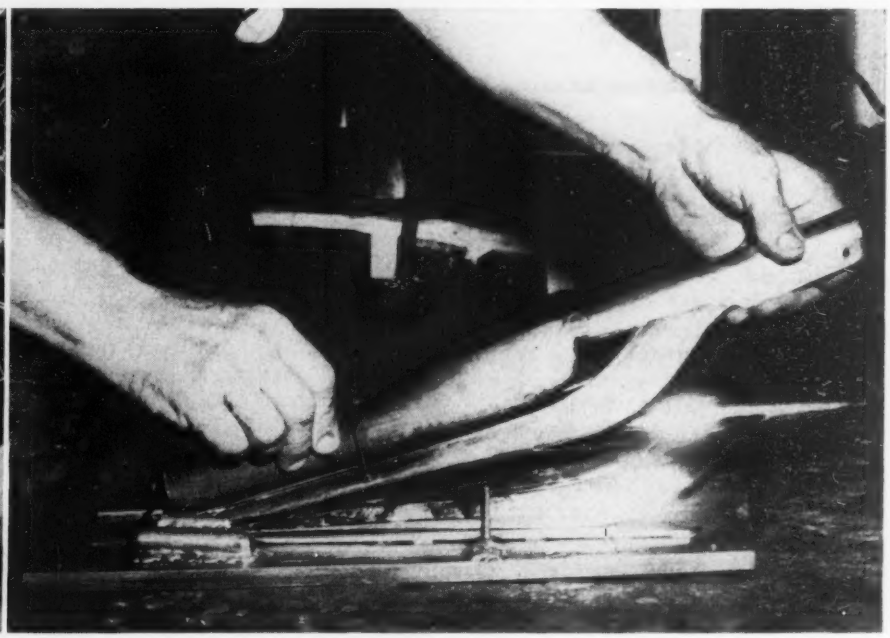
The pages which follow are tremendously interesting to me in that to a large degree they represent the fulfillment of the business visions which Carl Struever confided to me more than 30 years ago when we both were taken out of Ordnance field service training in Camp Hancock, Augusta, Ga., and sent with a small group on detached service to the huge plants at Muscle Shoals, Ala., where the army was attempting to make "atmospheric nitrates" for explosives. That is how a machine tool man from Vermont and a metal coating man from Illinois happened to get together.

Just as Hamilton Maze succeeded his father as a director of the company, so also did Carl Struever eventually succeed his father as general manager. Over the 30 years of my acquaintance with Carl, I have watched his plans unfold to include copper-zinc, chrome-zinc, brass-zinc, nickel-steel, chrome-steel, brass-steel, copper-steel, nickel-copper, chrome-copper, nickel-brass, chrome-brass, chrome-aluminum and nickel-aluminum, in a wide variety of beautiful finishes. I have seen applications grow from a mere handful to many hundreds.

On this page I frequently have expressed my conviction that the days of prodigal use of our metals are over. Those metallurgists and industrialists out in Peru, Ill., sensed that situation a long time ago. By "spreading out" scarce metals over a big field, they have made possible more and better—and better looking—products for more people. They have conserved our metal resources. And they have built up a business which is a worthy example of what can be accomplished under our free enterprise system. My congratulations to Hamilton Maze, Carl Struever and their associates as they pass the "50th milestone" and set their business sights on one marked "1998"!



. . . . . during the chromium plating operation, the hood ornaments, two on a rack and protected by the masks, are immersed in the tank. Masks are then removed and the work is dipped in a tank for gold plating, as shown above. The gold does not adhere to the chromium plated area. Gold plated area then is sprayed with coating of clear enamel and dried by baking . . . . .



. . . . . painting mask placed over each ornament, leaves only the gold plated area exposed to the enamel. In the above view the painting mask is in process of being removed following the enameling operation. When the job is completed, each ornament looks like a 3-piece product. Same procedures can be used in manufacturing similar decorative products for other industries

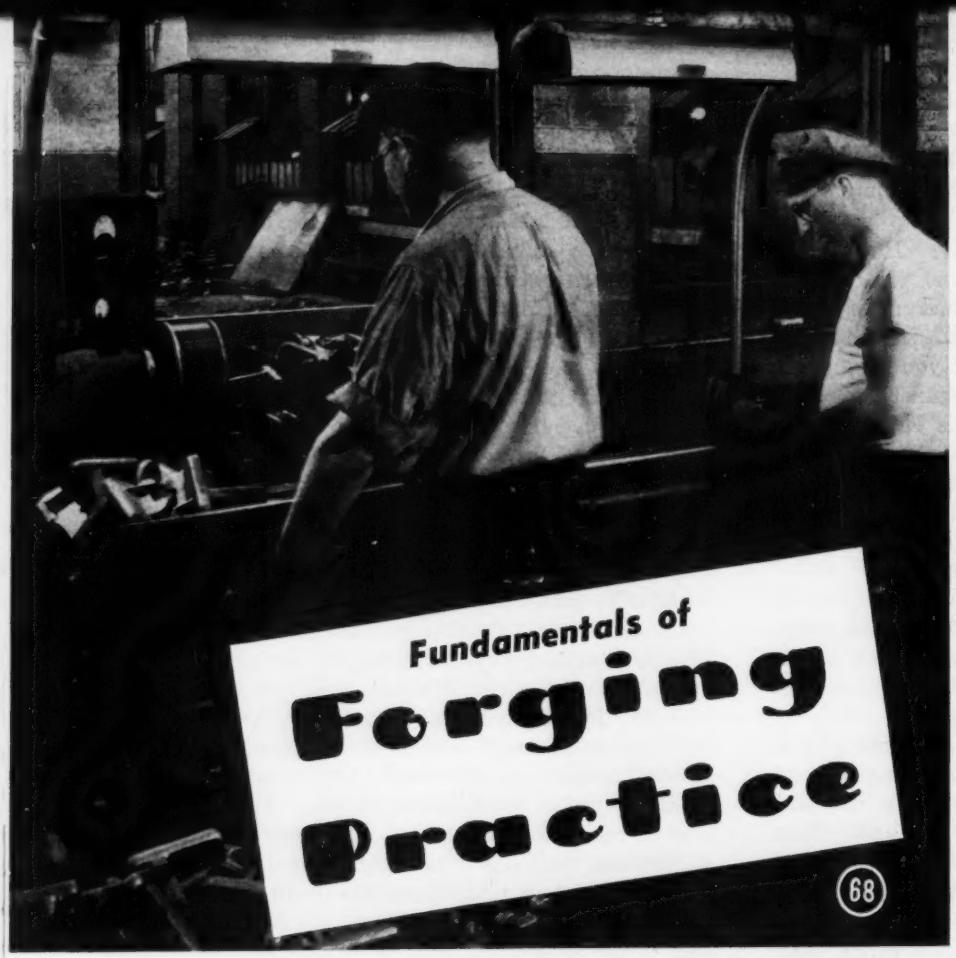


Fig. 68—Magnetic inspection for subsurface defects

Previous articles in the current forging series appeared in the following issues of STEEL:

June 7, p. 100
June 21, p. 98
July 5, p. 76
July 19, p. 99
Aug. 2, p. 91
Aug. 16, p. 94
Aug. 30, p. 59
Sept. 13, p. 100
Sept. 27, p. 89
Oct. 11, p. 101

Great variety of available forging metals, both ferrous and nonferrous, makes correct selection of composition extremely important. Characteristics and recommended applications for some of the more widely-used alloys are discussed here

Part XI of the current forging series

By WALDEMAR NAUJOKS

FORGING metals are available in a great variety of compositions. These vary from each other, with each alloy designed to serve some purpose a little better than any of the other compositions. At times, it is difficult to select one metal over another one for a given use. While the present knowledge of forging metals is by no means complete, much has been learned in the past 30 or 40 years, more, prehaps, than was known in the previous several hundred years.

Since the subject of forging metals is very broad and deep, it is not intended, nor is it possible, to cover the subject in detail. It is possible only to sketch briefly some of the basic facts about forging metals which can be used as a working foundation for some of the service applications, and on which more detailed information can be added. A small working knowledge of forging metals should help in understanding some of the problems that are entailed in their fabrication and in their use.

All forging compositions have properties desirable for some type of service. With a basic knowledge of the properties of each of the available compositions, it is possible to select a metal that seems to have the best combination of properties for a given service. It is also important to have a good working knowledge of forging metals so that the properties can be improved and developed by good forging practice. Even as good lumber can be spoiled by poor workmanship, so can the good qualities in a metal composition be lessened by improper forging practice.

Structural Steels—Structural steels are designed to be used in parts that serve as members of a mechanical structure, such as a machine tool, a tractor, an automobile, an airplane or similar mechanical devices. For example, tool steels are designed primarily to be used in tools that are used to shape metals, woods and plastics; similarly, structural steels are used as structural members of mechanical equipment. In the succeeding paragraphs, terms such as structural steels, tool steels, die steels, corrosion resisting steels, and similar terms will be used. Each term mentions steels or metals designed for the uses described. This does not mean that such compositions are limited in use to the applications given but that they are able, in most cases, to offer good service in those fields of use.

Structural steels are so-named to indicate their use for component parts of machines and equipment, such as gears, arms, shafts, forks and other machine parts. Structural steels are considered in two general groups: Carbon and alloy. The more common and more widely used group is the carbon steel group.

Structural carbon steels may be considered in three general groups, the low carbon group, with carbon content up to about 0.20 per cent; medium carbon, 0.25 to about 0.60 per cent and the high carbon group with the carbon content over 0.60 per cent. Formerly, the low carbon group was known as "soft" or "mild" steel. The medium carbon group was commonly designated as "machinery steels" because this group enjoyed considerable use in parts for machinery and machine tools, such as shafts, hubs, gears, tool post holders, arms, and similar parts. High carbon steels were considered "spring steels". Today, steels are selected for composition by their AISI numbers, or for properties by some standard specification, such as given by

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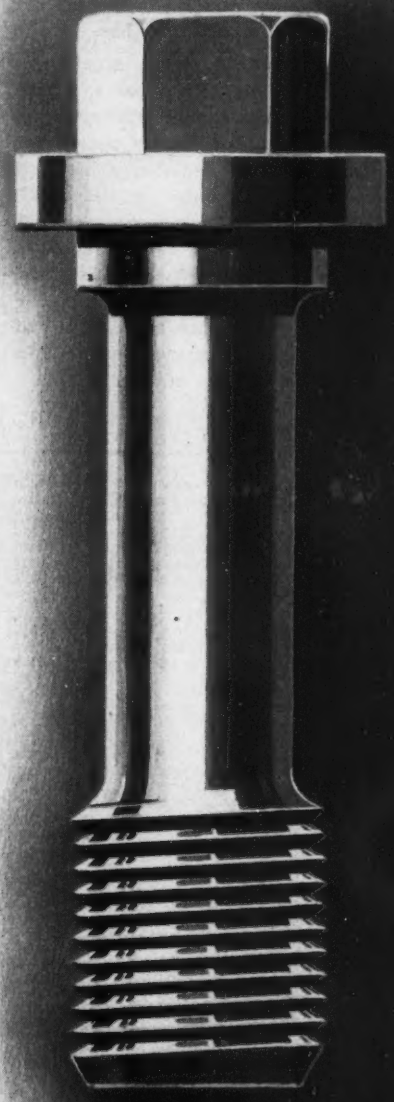

they do the job well because they are well made . . . . . .

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ASTM, API, ASME, or AMS.

The low carbon grades are the most widely used of the straight carbon structural steels, perhaps 75 per cent of the carbon structural steel production being in the low carbon group. The low carbon steels have fair strength, with tensile strengths ranging from about 45,000 to about 60,000 pounds per square inch. These low carbon steels do not respond appreciably to heat treatments and are not used where hardening and tempering are necessary. These steels are readily forged and can take considerable mistreatment without affecting their properties too much. They machine easily and well, except that they are not recommended for very fine machining finishes, they are too soft for very fine threads to close tolerances and similar fine machine surfaces.

Low carbon steels are used for most of the stamping products; they weld easily, can be bent and shaped cold to a considerable degree without breaking, and in general, are used for a wide range of products where hardness is not essential. Nearly all of the structural shapes used in buildings, bridges and boats, such as I-beams, T-bars, angles, channels, flat and round bars are made from low carbon structural steels. Other products would include welded and seamless pipe, boiler plate, nails, bolts, screws, nuts, wire, steel window sash, and many other familiar products too numerous to list.

Low carbon structural steels are also used for carburized parts, where a suitable carburizing treatment is used to add carbon to the outer surface of a part. After the carbon has been added, the outer surface will respond to heat treatment, so that the part can have a hard case with a soft inside core. Wrist pins, used to connect one end of a connecting rod with a piston, are an example of a part that is carburized to obtain a hard, long-wearing surface with a soft, tough core.

Medium Carbon — Medium carbon structural steels have a higher tensile strength than the low carbon steels. Steels in this group respond to heat treatment by hardening and tempering, with the effects being more apparent as the carbon content is increased. The ability to heat treat these steels permits the selection of the proper combination of hardness and toughness for strength, wear, machinability, and resistance to impact, to a greater degree than is possible in the low carbon grades of steel.

Medium carbon steels forge well, have excellent machining and good welding properties if the carbon content is not over 0.35 per cent. Steels with a carbon content over 0.35 per cent are quite weldable but with greater care. Medium carbon steels bend less easily than do low carbon steels. These do not harden readily to hardnesses beyond where they are not machinable, and are not used where high hardness, such as for a

USES OF VARIOUS AISI FORGING STEELS

AISI 1010, 1015—These compositions are quite soft and are used where maximum ductility and best weldability are desired. These grades are used for most carburizing applications. Camshafts and wristpins are made from these grades.

SAE 1020—Used for general forging products where an economical steel with fairly good physical characteristics is desired on forged parts that do not require heat treatment. Not recommended where fine machining surface is necessary. Handhole and manhole covers, air compressor valve seats, bolts, brackets, lever arms, clevises, eyebolts, pipe fittings, flanges, straps, nuts, handles, tongs and yokes are a few items forged from this grade of steel.

AISI 1030, 1040—Intended for general forging products where good forging qualities, excellent machinability, and response to heat treatment is desired for good physical properties in an economical steel. These grades should not be used for carburizing. Better strength, more stiffness, finer machining qualities than in the lower carbon grades. Crankshafts, connecting rods, gear blanks for moderate service, frames, hooks, jaws, spindles, shafts, shackles, yokes, eccentrics, and machine handles are some of the forged parts using the medium carbon structural steels. Where welding is necessary, it is desirable to keep the carbon content under 0.35 per cent.

AISI 1050, 1060—Used for general forgings of the same nature as given for the medium carbon grades. Desirable for larger forgings and for parts where higher strength and hardness are required and where the lesser toughness is not objectionable. Also preferred on parts that encounter considerable wear. Large shafts, pinions, gears and connecting rods are forged in these grades. Desirable steels for flame hardening purposes.

Alloy Carburizing Steels—Carburizing steels are used where high surface hardness is desired for resistance to wear and where a good ductile tough core is necessary to prevent breakage by shock or impact.

AISI 2315, 2320—Used where greater core toughness is necessary than given by the plain carbon grade of carburizing steels. Lower hardening temperatures due to the nickel content are desirable in reducing warping and distortion of parts during heat treatment. Machining qualities compare favorably with plain carbon steels.

AISI 2515—Higher nickel content in this steel develops better toughness and physical properties and offers a hard surface backed up by a core of high strength. The lowered heat treating temperatures permit heat treatment with a minimum of warping in the parts. Machines well but not as easily as the plain carbon carburizing grades.

AISI 3115, 3120—Offer economy and strength for applications where the plain carbon grades are lacking in strength. They machine well and harden uniformly. Used for gear and worm parts where conditions are not extreme.

AISI 3312, 3315—High chromium and nickel contents in these grades are used to develop resistance to high pressures, impact and abrasion. The dense structure, requires care and experience in forging and heat treating. Properly forged and heat treated, these steels are considered ideal where the operating conditions are severe.

AISI 4615, 4620—Offer good properties with a deep hard case. They can be used for a variety of carburizing applications. Many consider this composition as being one of the best all-around alloy carburizing steels. They forge well and have good machining properties.

AISI 4815—Used for applications similar to those for SAE 4615 and where greater core strength is necessary. It is similar in physical properties to SAE 2515.

AISI 6115—For applications where good core properties are desired with high surface hardness. A desirable steel where close heating temperatures are not available. Specified for parts subjected to fatigue stresses.

Alloy Structural Steels—Alloy structural steels are used for applications where the carbon structural steels do not have suitable physical properties. The selection of an alloy structural steel must be based on strength, safety, economy, ease of fabrication, and availability.

AISI 2330, 2335—Used for machine parts where toughness is desired to resist impact, shock and fatigue. The nickel content permits the use of these steels without heat treatment, but proper heat treatment will improve the strength and toughness.

AISI 3130, 3135—Used where economy with improved strength is desired. These steels forge well, machine well, and develop better properties than obtainable in plain carbon grades. It is desirable to heat treat these steels to bring out their best properties. They are interchangeable with SAE 2330 and SAE 2335 on many types of service.

AISI 3230, 3235—Contain more nickel and chromium than the SAE 3100 series and are intended for heat treated forgings subjected to more severe service than intended for the SAE 2300 and the SAE 3100 steels. Steels in the SAE 3200 series respond to heat treatment better in large sections.

AISI 3335, 3435—Have a high nickel and chromium content, and are used for applications where the conditions of strain, impact, and wear are severe. Because of the high alloy content, it is important that extreme care is used in forging and heat treatment.

AISI 4130, 4135—May be used interchangeably with SAE 2330, 2130 and 3135 and are preferred for forgings that will be machined in the heat treated state. With suitable experience, the SAE 4100 series forges well and has a good response to heat treatment. Machines at good hardnesses after heat treatment.

AISI 6130, 6135—Can be used interchangeably with SAE 2330, 3130, and 4130 for many applications. It is a good heat treating steel, and is particularly valuable where fatigue stresses are encountered.

AISI 2340, 2345—Are used considerably in the machine tool industry for forgings, such as shafts and pinions, that require high hardness and are subject to shock and impact. These steels have good toughness.

AISI 3140, 3145—Offer fine physical properties and good hardness for an economical alloy steel. They are widely used in the automotive, oil field, railroad and valve industries, and find many uses in general industrial applications. They forge easily, heat treat well and have good machinability.

AISI 2340—Intended for use on conditions that are more severe than those for SAE 3140. It is also used for forgings of larger sections because of better penetration of the heat treatment. It is not recommended for gears and similar applications.

AISI 3340, 3450—Intended for service encountering severe dynamic stresses which require high physical properties. The dense structure of these alloys makes them sensitive to forge heating and to heat treating; extreme care and experience is required to handle them in order to develop their full properties in the forging and heat treating operations.

AISI 4140—This steel can be used interchangeably with SAE 2340, 3140 and 6140 for heat treated forgings. It is preferred for forgings that are to be machined after being hardened and tempered.

AISI 4340—Combination of chromium-nickel-molybdenum in this steel offers a fine hardenability, high strength, and toughness. It is considered by many to be the best steel for applications where all kinds of stresses are encountered. It requires care in forging and heat treating to develop the full benefits imparted by the alloys. It can be machined in the heat treated state at hardnesses over 400 BHN.

AISI 6140, 6150—Can be used interchangeably with the SAE 2340, 3140, and 4140 steels for heat treated forgings requiring good strength. Especially desirable where vibration fatigue stresses are encountered.

AISI 1095—Used chiefly for forgings requiring high hardness or high resiliency, such as spring parts. It is sometimes used as an economical substitute for straight carbon tool steels, where the fine tool steel qualities are not needed.

AISI 9255—Used in place of SAE 1095 where greater strength and elasticity is desired. Many of the automotive springs are made of this steel.

Idea that helped write big profits

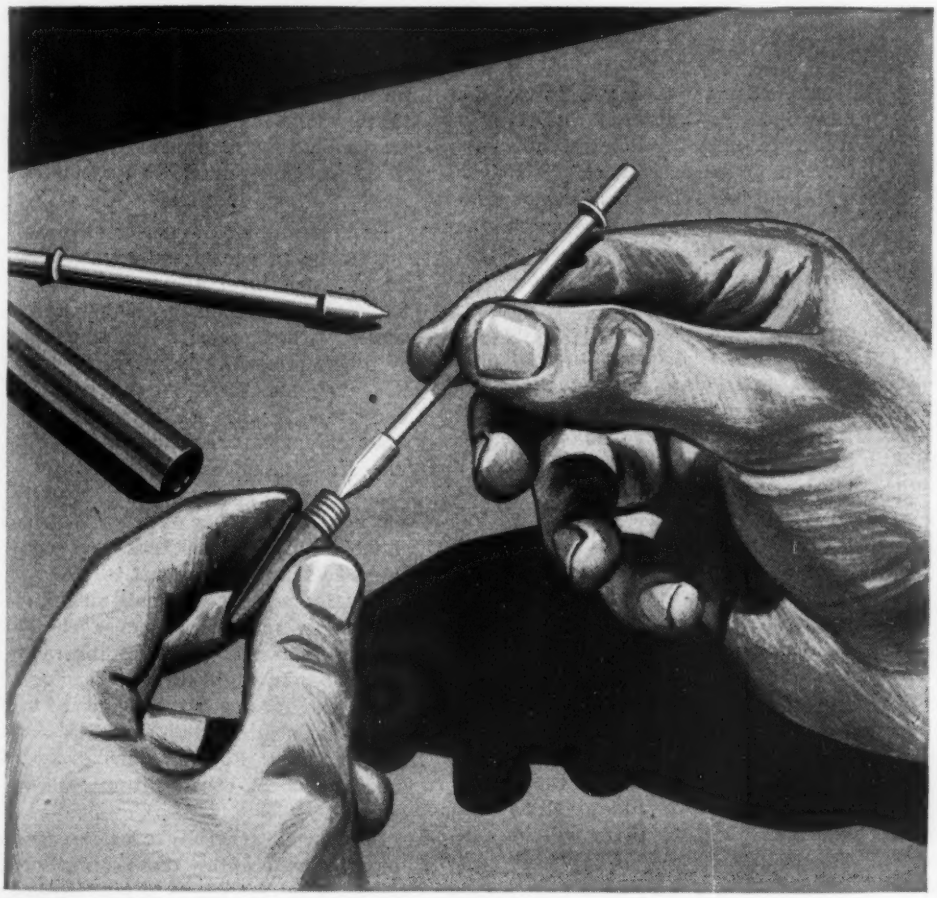
This is an ink cartridge of a ball point pen.

This particular cartridge hurdled design problems, sped production and helped write extra profits for several manufacturers.

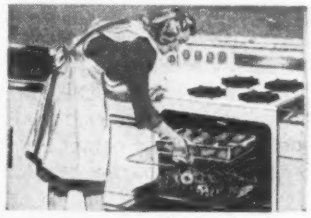
For it's simply a section of double-walled Bundyweld* Tubing. Strong, lightweight and quickly fabricated, Bundy Tubing was perfect for the job. All that was needed was the *idea* of using Bundy.

By the same token, *you* might need only to check into Bundy to really put over a product you're working on now. For you'd be amazed at where you can use Bundy Tubing.

Look at the examples at the right. Some are present uses of Bundy, others are hints of *brand-new* ways Bundy might make real money for someone, maybe you.

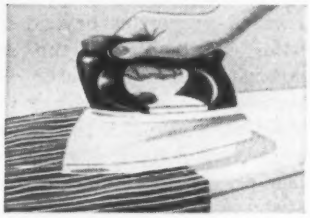


1 Does your product travel on wheels? Bundyweld* is a star performer in automotive and Diesel fields. *It's double-walled*—rugged, vibration-proof and top choice for fuel, pressure and hydraulic brake lines.

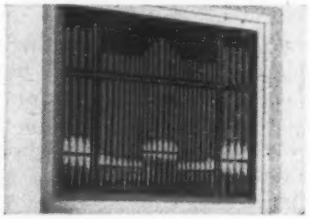


2 Maybe you make sleek, new ranges for the rich appliance market. Better check on Bundy for supply lines and for pilot light and flash tubes. Others have, and Bundy's strength and ductility have paid off.

3 You'll find Bundy Tubing in toys, garden tools, clocks, and even shoe lasts like the above! A "thimble" of Bundyweld in the heel braces the key that pulls the last from the finished shoe. Now, want some new ideas?



4 Why not use Bundyweld Monel or nickel in steam irons? Bundy's thinner walls conduct heat faster (more efficient irons!) and its purity prevents steam from discoloring fabrics (higher quality irons!).



5 Maybe you could take a tip from Panel 1 above and check on Bundy for smaller air pressure lines in pipe organ installations. No other tubing offers all of Bundy's features. Available in steel, Monel or nickel.

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6 Many a manufacturer got off to his most profitable product when he finally looked into Bundyweld, especially for an application that didn't seem to call for a *tubing* at all. No telling how easily Bundy can give you a smarter, stronger product, turned out faster at less cost. Bundy engineers are willing to try. Just call or write *Bundy Tubing Company, Detroit 14, Mich.*

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Bundyweld Tubing, made by a patented process, is entirely different from any other tubing. It starts as a single strip of basic metal, coated with a bonding metal.

This strip is continuously rolled twice laterally into tubular form. Walls of uniform thickness and concentricity are assured by close-tolerance, cold-rolled strip.

Next, a heating process fuses bonding metal to basic metal. Cooled, the double walls have become a strong, ductile tube, free from scale, held to close dimensions.

Bundyweld comes in standard sizes, up to 5/8" O.D., in steel (copper or tin coated), Monel or nickel. Special sizes can be furnished to meet your requirements.

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cutting edge, is necessary.

The high carbon group is used where hardness, reasonable toughness and more resistance to wear, abrasion and bending are desired. These steels have good forging properties, machine well with proper heat treatment, though not as easily as the medium carbon grades. In the upper end of the carbon range, they can be heat treated to hardnesses beyond the machinable range. Where sections are large in area, the full hardness does not penetrate very deep and the center hardness is much less than the outside hardness. Straight carbon steels are considered "shallow hardening steels".

Carbon steels, in the low and medium carbon ranges, are available with the sulphur content higher than is permitted in the regular grades. Such grades are called the "free machining" grades, since the increase in sulphur content improves the machining qualities. While the increased sulphur content improves machinability, it decreases the strength somewhat. High sulphur steels do not forge as readily as regular carbon steels, being more likely to develop cracks during forging operations. The tendency toward cracking while the steel is at forging heat is termed "red shortness." High sulphur grades do not weld as readily as the low sulphur steels. High sulphur grades are used for screw machine operations on items that do not require the full strength of the low sulphur grades.

Alloy Structural Steels—Alloys are added to structural steels to permit the steels to develop mechanical and physical properties beyond the properties obtainable in the structural carbon steels. Greater strength, higher hardness, deeper hardness penetration, greater toughness, better wear, and longer life are some of the properties imparted by alloys. Structural alloy steels contain one or more alloys in addition to the iron and carbon content. Specific properties depend upon the kind of alloy or alloys used and upon the amounts that have been added.

Some of the alloying elements impart their full benefits directly to the steel, regardless whether the steel has been heat treated or not. Other alloying elements require suitable heat treatment to develop their full benefits. Selection of a specific composition from among the strucutral alloy steels depends upon the service to which the steel will be put.

Nickel is one of the important alloying elements. It is the first alloy used to improve properties of straight carbon steel. In structural alloy steels, nickel increases tensile strength without losing toughness or ductility. It improves resistance to shock, impact and fatigue. It retards the tendency toward grain growth at heat treating and forging temperatures and reduces the tendency toward overheated steel. The addition of nickel to steel lowers the required heat treating temperatures because it reduces warping and scaling in heat treating. Amount of nickel in in the nickel alloy structural steel ranges from about 1 to about 5 per cent in the different grades. Nickel is also one of the important alloys in stainless steels and stainless metals and its use there will be considered later.

Chromium Important — Chromium has risen to important heights in structural alloy steels in recent years. Chromium increases tensile strength and improves deep hardening properties. Since chromium raises the heat treating temperatures in steels, it is seldom used alone as an alloy. It is used with nickel to make chromium-nickel alloy steels, with molybdenum to make chromium-molybdenum steels and with both nickel and molybdenum to make the chromium-nickel-molybdenum series of structural alloy steels. In structural alloy steels, the chromium content varies from about 0.50 to about 2.00 per cent, depending upon the particular alloy series. Chromium in amounts of about 5 per cent is used to make steels that resist "creep" at temperatures around 1000° F. Creep is a tendency of steel to stretch very slowly when under high pressure at fairly high temperatures, causing leakage after months of service. Chromium is also one of the important alloys in stainless irons and steels and its use there will be considered later.

Molybdenum is an alloy that serves a wide range of uses. In structural alloy steels, molybdenum (usually called "moly") serves to increase tensile strength and reduces the tendency toward grain growth at heat treating temperatures. It tends to widen the permissible heat treating and forging temperatures range and helps to increase hardness penetration. Molybdenum also has a beneficial effect upon the other alloys in steel, increasing the effects of the other alloys. One of the important and valuable properties of molybdenum is that it permits the machining of parts at higher hardnesses than in steels without molybdenum. Molybdenum has proved a good substitute for tungsten in making high speed steels.

Manganese is present in all steels in small amounts under 1.00 per cent. It contributes to the making of sound steel during melting and solidifying stages and increases the forgeability of steel by reducing the ill effects of oxides and sulphides. It helps to increase tensile strength and toughness, lowers the hardening temperatures. It is also used as an alloying element in amounts from 1.00 to about 2.00 per cent. Within limits, it has the effect of improving the machinability of steel.

Tensile Strength Improved—Vanadium increases tensile strength of steel and contributes to making sound steel. It improves resistance to shock or impact and increases life of steel where it is subjected to fatigue stresses. It reduces the tendency towards grain growth at heat treating and forging temperatures and reduces sensitivity toward prolonged heating. It helps bring out the beneficial effects of other alloys.

Boron is one of the newer elements that is being considered as an alloy for the structural alloy steels. It is finding use in producing higher hardnesses without a corresponding loss in toughness. At the present time, the available data on the uses of boron are insufficient to indicate to what extent it might be used, but it appears to be of considerable promise.

Alloy and carbon steels usually contain several other elements in very small quantities, but these are considered usually as impurities. Silicon is usually present in small amounts; it aids in making sound steel. In larger amounts, silicon increases brittleness in high carbon structural steels and increases the tendency toward grain growth at hot working temperatures. Forging quality steels keep the silicon content to a low percentage.

Sulphur is generally considered an impurity where the full strength of the steel is desired; it is kept to low percentages, except in the special free-machining grades. Phosphorus is contained in all steels in very small amounts, but it is considered an impurity and the amount is kept as low as possible. It tends to improve machinability but reduces ductility and malleability. Aluminum is used in steel-making as a cleaning agent and as one of the ingredients to control the basic grain size. This element is used in larger amounts in the production of nitriding steels where surface hardness is obtained by the use of nitrogen.

Alloy steels, in making use of one or more of the alloying elements to obtain improved mechanical properties of greater toughness, higher hardness, increased penetration of hardness, better wearing properties

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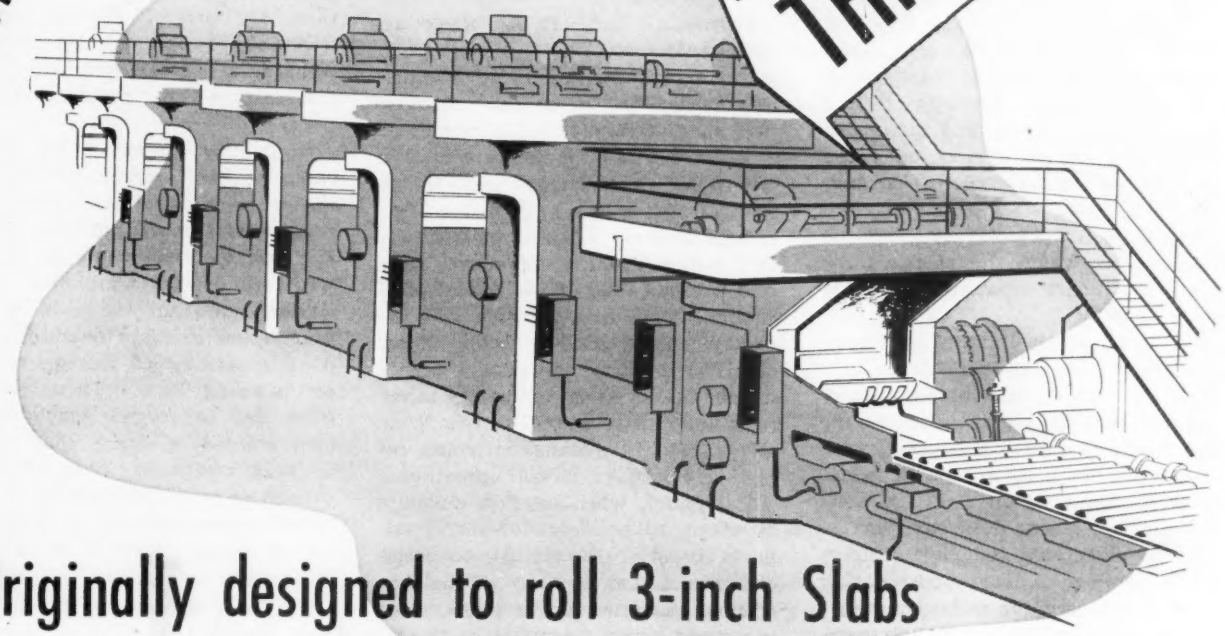

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better resistance to shock or impact, improved resistance to fatigue, machinability at higher hardnesses and other properties beyond the range of the structural carbon steels, are also more difficult to fabricate. As the alloy steels increase in strength and toughness, they become increasingly difficult to forge and to machine. They become more sensitive to heating and heat treating and must be handled with care and experience. They increase the wear to forging dies and to machining tools.

"Best" Steel—"What is the best steel?" The question has been asked many times in the past years and in the past centuries, perhaps. It will be asked again today and tomorrow. There can be no answer until the question is made complete. To suggest a suitable steel or metal composition, it is necessary to know the purpose for which the part will be used and under what conditions it must function.

After all of the known conditions are considered, it is possible to suggest compositions which seem to have the best combination of properties for the particular service. A steel that is suitable for a lathe tool bit is not suitable for a chain link. A steel designed for heavy duty gear service will be unsuitable for high temperature service. A corrosion-resisting steel is not used for carburizing purposes. In other words, the best composition for one purpose will be least desired for another purpose. The reason for the many carbon and alloy steel compositions is to have suitable compositions available for the many types of uses. Experience and technical knowledge are the best guides in the selection of a composition for a given use.

The SAE steel numbering system was designed by the Society of Automotive Engineers to identify the composition of the many standard and recognized structural carbon and structural alloy steels. This system has been in use for many years. In the recent years the American Iron and Steel Institute, together with the Society of Automotive Engineers, developed the AISI numbering system, which is based on the SAE system. Some modifications have been made in the AISI system to include the newer steel compositions. Since both systems are in use at the present time, it is desirable to have both charts available.

How To Select Composition—Selection of a steel or composition that is best suited for a given purpose requires a considerable knowledge of the various steels to make a good selection. It is possible, at times, to select several steels that will serve the purpose about equally well; in that case, the deciding factor may be the ease in obtaining the material, or in the ease of fabricating one composition as compared to another composition. The accompanying guide indicates the uses of the various SAE -AISI compositions in a general way. The guide does not make definite recommendations but it can offer general suggestions by mentioning familiar parts for which the various compositions have been used.

Corrosion and Heat Resisting Steels—Corrosion and heat resisting steels are commonly termed "stainless steels" but it is well to know that none of these steels is completely stainless to all possible corrosive conditions. Applications include resistance to ordinary corrosive conditions such as is caused by weather, dirt, soil, refuse, ice, and snow. They find a broad field of use for hospital equipment and surgery tools, milk industry, coal fields, oil fields, ships, chemical industry and similar places where the corrosive conditions range from mild to severe. The two basic alloys used in making corrosion resisting steels are nickel, chromium.

Chromium, when used in amounts of about 10 per cent or more, imparts to steel the ability to resist corrosive action of many of the conditions. A series of corrosion-resisting steels using chromium as the alloying agent, has been developed for commercial use. Straight chromium corrosion-resisting steels are available in two types: Hardenable and nonhardenable. Difference between the ability to harden and temper one type and not the other is dependent upon the amount of carbon in proportion to chromium. Strength of the straight chromium corrosion resisting steels is comparable to the strength of the medium alloy structural steels.

Nickel in amounts up to about 2 per cent is added sometimes to increase toughness without reducing corrosion-resisting properties. Many forgings which are forged from the straight chromium corrosion-resisting steels include valve gates and valve stems, golf club heads, air compressor seats, aircraft parts, gasket rings, street markers, tank fittings, flanges, surgical instruments and many parts for use in coal mining, oil field, and similar industries. Alloys with a very high chromium content find use in high temperature service.

Nickel and chromium are combined to make a wide series of the austenitic corrosion-resisting steels. They are often known as the "18-8" stainless series because the most widely used composition in the series contains about 18 per cent chromium and about 8 per cent nickel. These steels are nonhardening by the usual heat treating methods and are not used for applications requiring high hardnesses. However, they offer better corrosion-resisting properties over a wider range of applications than do the straight chromium series. Strength of these alloys is comparable to the strength of medium carbon structural steel. The chromium-nickel series is used for all the applications listed above where conditions are severe. Special combinations of chromium-nickel corrosion resisting steels are designed for high temperature heat-resisting applications.

High alloy content in the straight chromium and chromium-nickel corrosion resisting steels makes these compositions more difficult to forge and machine than many of the alloy structural steels. Chromium in particular slows up the rate of heat penetration in forge heating so that it is necessary to increase heating and soaking time. These compositions can be forged, machined and heat treated on those that respond to heat treatment, to produce full properties in the finished part. Good experience is essential in the working of these alloys to avoid undue difficulties.

Tool and Special Steels—Tool, die and special steels are made in straight carbon and in a variety of alloy grades. They represent the highest quality in the steel-making art and are designed for exacting service. In general, these steels are made to very rigid requirements which are beyond those imposed on the structural steels. Closer composition limits, fewer impurities, finer, denser grain structure and rigid control in every step of production tend to make tool and die steels superior. It is true generally that these fine steels must be forged, machined and heat treated with the same care and experience to bring out their important properties for the service they are expected to perform. The many grades of tool, die, and special steels for industrial uses are listed in literature available to the users and fabricators.

Nonferrous Forging Metals—Nonferrous forging metals are compositions in which the main part, or body, of the composition is not iron. Metals such as copper, nickel and aluminum are used as the base on which to form commercial alloys. In such alloys, iron is usually considered an impurity. These nonferrous forging alloys have many fine quailties; they are used for important applications

in the industrial and commercial world.

Copper is used in its pure form for the major portion of the electrical requirements. It also forms the basis for brass and bronze alloys. Many of the copper and copper alloys have fine or good hot-working qualities and the stronger brasses and bronzes have strengths comparable to low or medium carbon steels. Copper forgings are used mostly for use in electrical equipment. Brass and bronze forgings are used for many types of corrosion service where the conditions are not too severe. Grades adapted to hot forging usually forge well and have good machining properties. Some of the bronzes can be heat treated to develop good tensile properties.

The sound, dense structure in brass and bronze forgings is desirable for valve bodies, pipe fittings, valve gates, handwheels, connectors, impeller wheels, door and ornamental hardware, caps, fittings, handles, rings, artificial fishing lure bodies and many other items where the forgings are subjected to pressure or impact. Where the part is used in contact with sea water or high temperature steam, it is important to select a brass or bronze that tends to resist dezincification.

Nickel is used in the commercially pure form as a corrosion-resisting metal; it is also alloyed with copper to form Monel metal. Monel metal and nickel are highly corrosion-resistant to a large variety of corrosive conditions, including many chemicals. Their strength is comparable to medium carbon structural steels. Similar to the corrosion resisting steels, Monel metal and nickel are more difficult to forge and handle than ordinary alloy structural steels. They are not hardened by the conventional heat treating methods. A special Monel metal has been developed which can be given a heat treatment to develop medium high hardness.

Aluminum is the basis for a number of alloys which are used to make forgings. These offer strengths comparable to the low carbon steels, and their weight is only about one-third that of steel. Light weight with good strength has developed the use of aluminum alloy forgings for many aircraft uses on fittings and other parts that are not subjected to heavy shock. Due to the relatively low temperatures used in forging aluminum alloys, they are forged in a manner comparable to alloy structural steels. They are heat treated to bring out their full strength.

Magnesium alloys are used to make forgings on applications similar to those for the aluminum alloys. They are somewhat lighter in weight than the aluminum alloys and are not quite so strong. Principal application of magnesium forgings is for aircraft use.

Physical Property Charts—Data on expected properties of standard compositions in steels are available in chart form. These charts offer a quick and easy guide to the general properties of steels when given proper heat treatment under modern commercial conditions. Data used to develop the information on the charts are obtained, usually, from 1-inch diameter bars heat treated and then machined into standard 0.505-inch test specimens. Physical property charts are valuable for a general guide where conditions are not too exacting. Experience in the use of the physical property charts is desirable so as to make due allowances for section sizes, shape, and other conditons that may tend to modify the information taken from the chart.

Charts on the average properties of steels are subject to change as steel mill and outside research laboratories uncover new information and more exacting data. Improvements in manufacturing processes tend to reflect improvement in products and this, in turn, is reflected in data on the product. It is desirable to use latest available charts.

(*To be continued*)

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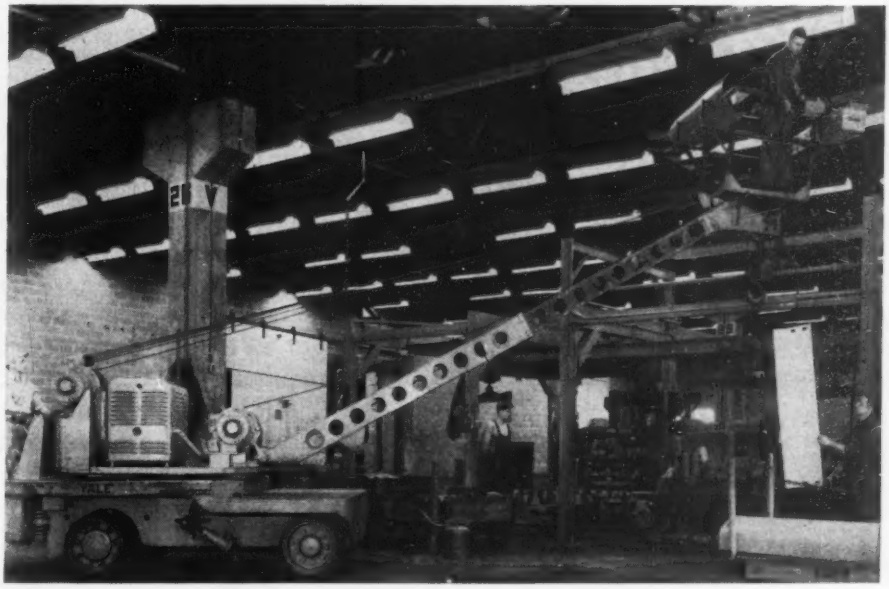

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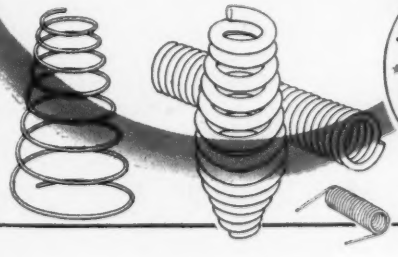

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in developing Stainless W, an age-hardening ferritic 17 per cent chromium, 7 per cent nickel.[12]

Second, the carbide phase, unfortunately, cannot be ignored. Note that in Fig. 4, carbide solubility changes abruptly with temperature. Therefore, during slow cooling a carbide precipitation occurs and these carbides, rich in chromium, precipitate at the grain boundaries. At the temperature where the precipitation occurs chromium diffusion from the matrix is not rapid enough to replenish the chromium taken out of the immediate vicinity of the carbide and consequently this region is low in chromium. Because chromium is the element largely responsible for the excellent corrosion resistant, the region adjacent to the carbide becomes lower in corrosion resistance and the material is susceptible to intergranular corrosion. Austenitic alloys are, therefore, heat treated by an anneal at a temperature high enough to effect carbide solution but low enough to minimize grain growth, and then cooled rapidly to room temperature to keep the carbides in solution.

Such a treatment is not always possible especially where these alloys are field welded, and consequently, modifications of the austenitic alloys have been developed. These consist of adding titanium or columbium. Titanium in amounts of four times carbon and columbium in amounts of eight times carbon are considered to be sufficient although the actual amounts necessarily depend upon the grain size and composition (other than carbon) of the material. F. J. Phillips of Carnegie-Illinois Steel Corp. has quantitatively evaluated the titanium necessary and developed a suitable formula.[13] This formula has been used with good success.

Stabilizing Treatment—Titanium or columbium grades are often given a stabilizing treatment at 1600° F to insure that the titanium or columbium completely immunize the carbon from precipitating as the chromium carbide. Present thought is that this treatment should not be used to evaluate the effectiveness of the titanium or columbium because for many applications this treatment is a difficult, if not an impossible, task.

During the discussion of heat treatments, stainless steels have been unavoidably divided into three general classes:

1. Martensitic—chromium alloys hardenable by heat treatment.
2. Ferritic—chromium alloys not hardenable by heat treatment (ignoring the 885° F embrittlement).
3. Austenitic — chromium-nickel alloys not hardenable by heat treatment and predominantly austenitic as commercially heat treated.

Hot Working—Unlike the carbon steels, ruptures in the stainless steels do not heal easily, if at all, and more conditioning is necessary. All of the stainless steels have lower thermal conductivity than the carbon and low alloy steels and accordingly precautions must be taken when heating, or surface burning will result.

Martensitic iron-chromium alloys can be forged, pierced, and rolled. Because these alloys are air hardenable, they must be annealed after rolling before any subsequent operation such as conditioning or cold working. Their "as-rolled" hardness also makes for brittleness which must be taken into account when the hot rolled product is being handled.

Ferritic iron-chromium alloys can also be forged, pierced and rolled. Because these alloys are very soft when hot, they are easily marked by guides or rolls. Over-heating causes excessive grain growth which makes the material susceptible to tears and cracks. Additions of nitrogen have helped somewhat in preventing grain growth. To refine the grain size, finishing temperatures are kept as low as possible. Annealing is necessary for those alloys which are known to be susceptible to the 885° F embrittlement.

Austenitic iron-chromium-nickel alloys are generally stronger at the rolling temperature and consequently require more power for deformation. Like the ferritic alloys, the austenitic alloys are susceptible to grain growth and over-heating should be avoided. Low finishing temperatures are not practicable because of the power required.

Alloys which are austenitic after cooling from the rolling temperature to room temperature can be rolled without difficulty. The usual precautions, such as slow heating, must be observed. On the other hand, those alloys, such as 18-8 molybdenum, 18-8 columbium, 18-8 titanium, 25-12 columbium, having a duplex structure (ferrite and austenite) show poor hot working characteristics which are blamed on the presence of the delta ferrite. Poor hot working characteristics are believed to be due to difference in plasticity between soft ferrite and tough austenite. Although no rupture has even been traced back to a ferrite pool, the fact remains that alloys containing ferrite are difficult to roll.

Cold Working—With the exception of the high carbon hardenable alloys, all of the stainless alloys can be cold worked. However, certain precautions must be taken.

Ferritic alloys, especially those containing over 20 per cent chromium, are extremely notch sensitive at room temperature and care must be taken to avoid notches, otherwise considerable breakage will result. However, between 400 and 600° F the alloys are tough, and difficult cold working operations are successfully accomplished by working the material in this temperature range.

Cold work causes the austenitic alloys to transform partially to a low-carbon martensite. This transformation together with the effect of the strain hardening caused by the cold work itself results in the austenitic alloys having a high rate of work hardening, and thus more power is required to work these alloys.

Corrosion Resistance—As was mentioned previously, the corrosion resistance of the stainless steels generally increases with increasing chromium content. There is today some speculation as to why chromium should impart stainlessness to steel. The popular concept is that when sufficient chromium is present, a thin, tight chromium oxide is formed on the surface and this oxide prevents any further oxidation or corrosion. Environments which are oxidizing in nature strengthen this film while reducing environments tend to break down the film and cause the steel to corrode.

This theory of passivation by an oxide film has some experimental support. The film has been stripped and isolated by Evans[15] and others. On the other hand, the theory has been questioned seriously by Uhlig and Wulff[16] who postulated that passivity consists in sharing electrons. The ferrous ion (Fe^{++}) is active; the ferric ion (Fe^{+++}) is passive. Chromium tends to take an electron from iron, render it Fe^{+++} and make it passive. On this basis, one chromium atom should passivate five iron atoms and the weight percentage for stainlessness is 11-15 per cent. Molybdenum adds to the effect of chromium because it has a stronger electron affinity. They suggested the possibility of an oxygen film similar in effect to the usual passive film. The mechanism is not that of a protective film of the paint or varnish type, but rather a film which reacts with hydrogen and prevents hydrogen from destroying the shared electron balance in the alloy. Further fundamental work is needed to clarify this situation.

Voluminous data have been pub-

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lished on the corrosion resistance of specific grades of stainless steel in specific environments. The data in the literature represent both controlled laboratory "beaker" tests and actual service records. To discuss these corrosion data properly, the subject of corrosion is divided into four separate parts: Atmospheric elevated temperature, intergranular and pitting corrosion.

Atmospheric Corrosion—Most common type of corrosion encountered in steel is ordinary rusting. Recent investigations of the atmospheric corrosion of stainless steels have disclosed that ferritic steels above 12 per cent chromium are fairly resistant, and above 18 per cent chromium are fully resistant to rusting. Fig. 5[17] shows graphically the effect of chromium content on the atmospheric corrosion of stainless steels. Noteworthy are the breaks in the curve at 3 and 12 per cent chromium. Some variations from this behavior may be expected in different atmospheres and when the stainless steel is in different conditions of heat treatment.

Austenitic steels are also very resistant to atmospheric corrosion. The results of a series of tests lasting over several years were reported in the 1946 American Society for Testing Materials symposium.[18] Results indicated that installations of 18-8 should be cleaned periodically especially in marine atmospheres where salt deposits might cause pitting. Of course, if the installation is fully exposed to the atmosphere, automatic cleaning occurs during rainfall, but installations which are fully or partially sheltered may be subject to pitting. 18-8 molybdenum was shown to have the best resistance to all conditions of corrosion. The effect of surface was also studied and it was reported that the smoother the surface, the better the corrosion resistance.

Amount of work which has been done on the corrosion of stainless steels in various reagents is voluminous but, unfortunately the data never have been properly organized. Some of the best data are in the much used Krupp tables, a sample of which is shown in Table II. Effect of chromium on the "wet" corrosion resistance is the same as that on the resistance to atmospheric corrosion, although nickel and molybdenum enhance the resistance to certain chemicals.

Elevated Temperature Corrosion—Corrosion at elevated temperatures is usually one of three types: Oxidation, carburization, and sulphidation. As was true for atmospheric corrosion, the resistance of the stainless steels to oxidation is primarily a function of the chromium content. Fig. 6 shows the amount of chromium necessary for freedom from scaling at temperatures from 1000 to 2000° F.

The chromium content also determines the rate of carburization. In general, ferritic steels are more resistant to carburization than are the austenitic steels. Addition of 2 per cent silicon improves the resistance of 18-8 and 25-20 to carburization, but the effect of titanium, columbium and molybdenum is negligible.

Usually, carburization rates are not appreciable below 1500° F in alloys containing 18 per cent or more chromium. However, under special conditions, especially cyclic oxidation and carburization, 18-8 has been known to carburize at a temperature of 1400° F.

Austenitic steels, because of their nickel content, are susceptible to attack by reducing sulphur gases, notably hydrogen sulphide. Ferritic steels are more resistant. Oxidizing sulphur gases slightly increase the corrosion of the austenitic and the ferritic steels.

These three types of elevated temperature attack are very important but too often neglected when recommending materials. In many installations, elevated temperature corrosion by oxygen, carbon, or sulphur causes more failures than stresses. Consequently, many of the alloys such as 18-8, while possessing adequate strength, will not meet service requirements because of excessive oxidizing, carburizing or sulphidizing conditions.

Intergranular Corrosion — Thanks to the excellent work of Bain, Aborn, and Rutherford,[19] the cause and cure of intergranular corrosion are well understood. The mechanism was described previously as a chromium impoverishment at the grain boundaries caused by the grain boundary precipitation of chromium-rich carbides.

There are two possible remedies for intergranular corrosion: First, the carbon may be immunized either by precipitating the carbide at a temperature where chromium diffusion will be rapid enough to restore passivity to the grain boundary area, or by forming a stable carbide of some element other than chromium, and second, a carbonless alloy may be used.

Of these methods, the formation of a stable carbide of some element other than chromium is the most popular. Bain, Rutherford, and Aborn suggested the addition of titanium in amounts four times the carbon content. By heating the titanium-bearing 18-8 at 1600° F, they caused the carbon to form titanium carbide, and the alloy was said to be stabilized.

Concurrent with this development, Union Carbide and Carbon Corp. developed a columbium bearing alloy having a columbium content eight times the carbon content. Columbium, like titanium, formed a stable carbide and thus prevented the formation of chromium carbide in the range 950-1300° F.

Recently, Carnegie-Illinois Steel Corp. has developed a method by which 18-8, containing 0.030 maximum carbon, could be melted. This alloy does not precipitate carbides, and thus is less susceptible to intergranular corrosion.

Pitting Media—Pitting usually occurs during continuous exposure to relatively weak corroding media, such as chlorides, to which the steels are otherwise substantially resistant. Very little is known about the cause of this type of corrosion except that it probaly occurs in certain vulnerable spots where the passivity is continuously destroyed. Pitting usually manifests itself by small holes distributed at random throughout a section of steel, or it may develop at points where the steel is in contact with other materials, such as leather, glass, and grease. The formation of an electrolytic cell may be the cause. Mechanism probably involves a lack of oxygen on the surface of the metal that has been corroded.

Pitting may be somewhat inhibited by treating the steels with some strong oxidizing medium such as chromate or phosphate. Molybdenum additions to 18-8 also inhibit the pitting process.

Low Temperature Steels—At extremely low temperatures, ferritic and martensitic steels are quite brittle, having impact strengths on the order of one foot pound. However, austenitic steels have impact strengths at minus 320° F of 40-60 foot pounds and are the best materials for use at the extremely low temperatures.

Range of room temperature physical properties of each grade of stainless steel is given in the American Iron & Steel Institute Steel Products Manual. Table III shows the properties of Type 410 (12 per cent chromium).

These martensitic grades are hardenable by heat treatment, and by proper selection of composition and heat treatment, their tensile properties can be made similar to those of the low alloy steels. Ductility values and impact strengths are somewhat inferior to the alloy steels.

The ferritic grades cannot be hardened to any extent by heat treat-

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ment. (To any extent, because the 885° F embrittlement involves some hardening). Table III shows the representative properties of 17 per cent chromium, type 430.

Behavior of Ferritic Alloys—Notch sensitivity, or rather the transition temperature from brittle to ductile behavior, increases with chromium content. The 27 per cent chromium alloy has a Charpy impact strength of only 2 foot pounds at room temperature. This notch sensitivity is undesirable, and when fabricating these alloys, special precautions must be taken.

Because of the notch sensitivity, further aggravated by large grains and 885° F embrittlement, both of which may result from welding, the ferritic alloys have not found as wide usage at room temperature as have the austenitic alloys. Ferritic alloys, however, have as good corrosion resistance as the austenitic alloys. If it were not for the disadvantage in ductility, they would be used almost as much as the more expensive austenitic alloys. There is need for a straight chromium alloy having at least 16 per cent chromium for corrosion resistance and possessing good ductility in as-welded condition.

Cold Work Hardening—Austenitic alloys are not hardenable by heat treatment but they can be hardened by cold work which transforms the austenite (meta-stable at room temperature) to a low carbon martensite. This transformation hardening by cold work is additive to the strain hardening also resulting from cold work and the result is that an extremely wide range of tensile properties may be produced. As an example, Table III shows the representative properties of type 301 (18-8). As would be expected, the degree of hardening obtained by cold work is a function of the composition and extensive investigations have been made on the effect of various elements on the work hardenability of 18-8.

Disadavantage of the austenitic stainless steels is that the work hardening is confined to those shapes which can be rolled (cold worked). For example, an article such as a valve cannot be hardened economically by cold working. This disadvantage has been overcome by the recent development of an age hardening material, Stainless W.[12]

Stainless W is essentially a 17-7 alloy containing titanium and aluminum. As would be expected, this is an "unbalanced" composition. At high temperature its structure consists of austenite and delta ferrite. On cooling, the austenite transforms at 200° F to low carbon martensite so that the room temperature structure of this alloy consists of martensite plus delta ferrite. The age hardening will occur in the martensite and the ferrite but not in the austenite. Aging is accomplished by heating in the temperature range 900-1050° F. Table IV shows the typical properties of Stainless W in the annealed and aged conditions.

Elevated Temperature — Fig. 7 shows the creep strength of many of the commercial stainless steels compared with carbon steel. Note that the austenitic steels have higher strength than the ferritic steels and that additions of chromium and silicon have little effect on the creep strength. On the other hand, the effect of molybdenum, columbium, and tungsten is marked.

Although the creep strength of the stainless steels is good, certain improvements are necessary.

1. The creep strength of the ferritic steels is not in line with their excellent oxidation, carburization and sulphidation resistance.
2. The effect of various heat treatments and structures is not fully understood.
3. The creep strength of the best alloy is not good enough for the newer applications.

Present research work is directed toward obtaining these improvements.

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Finishing Efficiency

(*Continued from Page* 70)

or other suitable shapes and processing compounds. Here too, work is performed according to specified formulas of parts, processing media and compound in proper proportions.

Economy, output and uniformity realized in any instance depend chiefly on how adaptable the part is to the process or processes required. Provided the part is highly adaptable for finishing by this mechanical means, the chances for establishing substantial savings are excellent.

Adaptability, in turn, depends on such factors as size, shape, weight, hardness of part, kind of material from which made and type of fabrication used. In many cases, these factors cannot be changed. But where slight changes can be effected—redesigning the item with curved surfaces to replace flats and eliminate sharp corners and edges, for example—such changes frequently spell the difference between success and failure of results obtained from mechanical finishing.

Regarding uniformity of results produced, there is no question that whenever the human element connected with any finishing operation is minimized, results of greater uniformity are obtained. This is particularly the case with a mechanical finishing operation compared to a manual finishing operation. Results can be maintained on a highly uniform level at all times by closely controlling a few simply regulated application variables. Such results are then duplicated consistently merely by setting up these operation standards.

Operational Variables—Among the more important of these operational variables are: Size of processing compartment, amount of chip mass, size and kind of chips, amount of work load, work load-to-chip mass ratio, rotation speed in relation to diameter of processing compartment, amount of solution relative to total mass, type and amount of processing compound. Thus, many conditions must be met for satisfactory results. By standardizing as many of these factors as possible for each individual process, a relatively simple operating procedure can be established to secure the desired result in grind-

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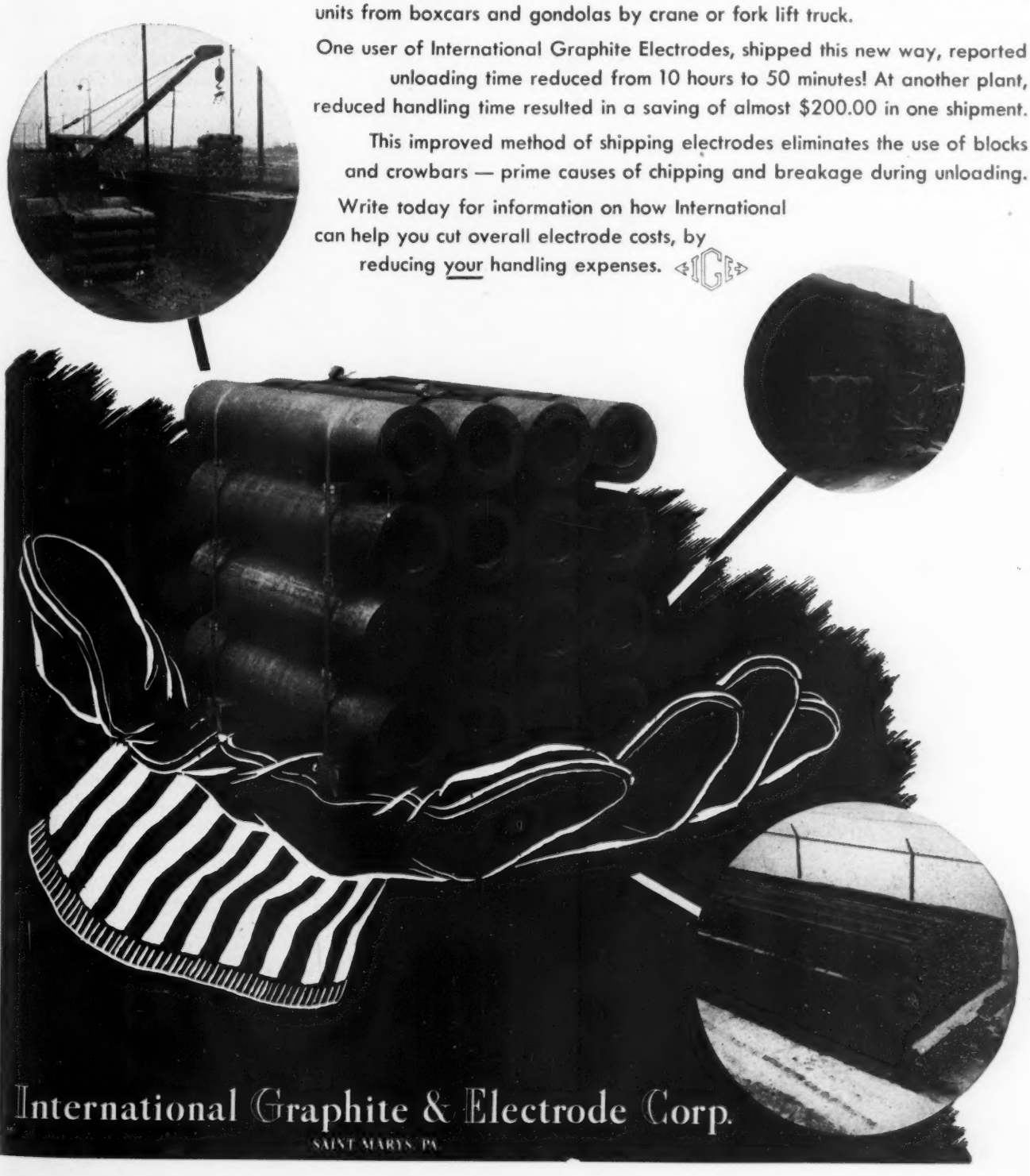

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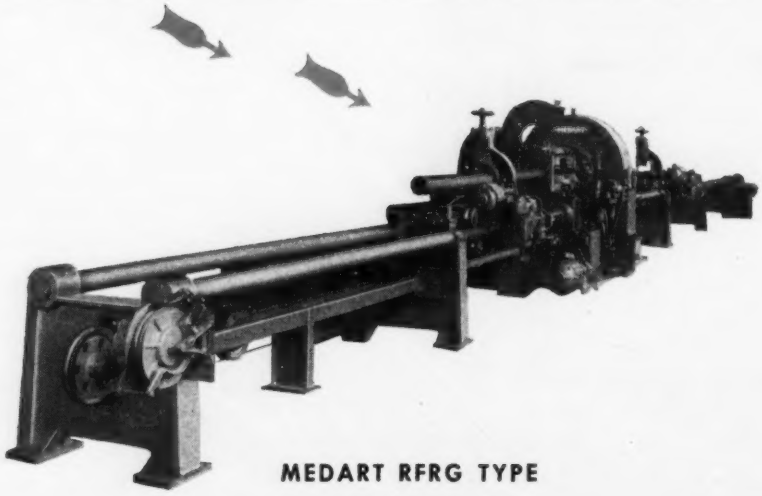
The new Medart RFRG type turning machine gives the exact ratio between cutting speed and bar feed rate for superior finish and close tolerance in precision turning, and high production on rough peeling or scalping. Speed and range of materials turned is limited only by the capacity of present day cutting tools. This new machine is completely push-button operated, and its improved, direct drive is actually simpler . . . easier to operate!



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ing and deburring, britehoning and wet-coloring.

Limitations — Like every other process, the technique has its limitations. It does not produce a finish comparable to a buffed job in all instances. Neither are parts having relatively large areas of flat surfaces and sharp corners or edges as easily processed to a smooth, lustrous surface as similar parts having rounded corners and edges and curved surfaces.

Recessed areas, moreover, are not finished as well as exposed areas. Heavy burrs—and even light burrs in inaccessible locations—ordinarily cannot be removed without considerable difficulty, a condition which sometimes makes it necessary partially to supplement the mechanical operation with a manual operation.

Limitations for the different processes are not all the same. Generally, they are less critical for grinding and deburring than for britehoning, while those for britehoning are less critical than those for coloring. Such limitations are determined largely by the results obtained from processing, and these, as noted earlier, depend on several factors.

Optimum results require sturdy equipment, well-built and correctly installed, plus adequate handling facilities. Proper location of the department in the plant is another consideration. Adequate drainage and water supply should be provided, and good plant housekeeping regularly practiced. Chips should be screened to size and additions made regularly to maintain processing masses of the correct chip size and amount. Chip and compound storage should be provided conveniently in the department or near the operation. Careful planning and controlled operation pay big dividends.

Report Describes German Coking Methods

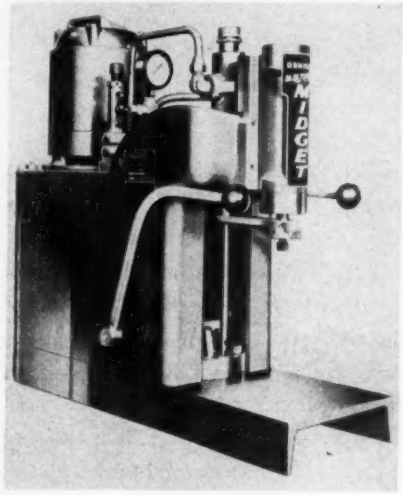
Latest German coking practices and equipment are reported in a survey released by Bureau of Mines, Department of the Interior, Washington, as part of domestic and foreign coal technology coverage. Part I of the two-part publication consists of three technical papers covering aspects of the production of metallurgical coke in wartime Germany.

Actual operation of slanting type Didier coke ovens is described in part II of the 74-page report. Operating details given embrace the type of coal used, percentage of coke and byproducts produced from a ton of raw coal, as well as cost and labor statistics. Diagrams of equipment and a bibliography also are included.

New Products and Equipment

Packaged Press Unit

A multipurpose, oil-hydraulic press of 2000-pound capacity, with its own pumping equipment, is being offered as a packaged unit by Denison Engineering Co., 1160 Dublin Rd., Columbus 16, O. Named the Multipress Midget, it has ram stroke, ram speed and ram pressure which are regulated by controls at the operator's fin-



gertips. The press measures 13 x 30 x 29¾-inches and weighs 270 pounds.

Regardless of size variations in the parts, the preset pressure selected is exactly reproduced. A safety feature of the unit requires use of both hands before the ram will descend. Statistics: Ram stroke, 6 inches; throat depth, 4⅝-inches; daylight opening, up to 15⅜-inches; ram speed, 600 inches per minute (up) and 400 inches per minute (down).

Check No. 1 on Reply Card for more Details

Ball Transfer Table

All types of cartons, etc., with flat bottoms can be handled on the ball transfer table announced by Sage Equipment Co., 30 Essex St., Buffalo 13, N. Y. Sturdy construction of the

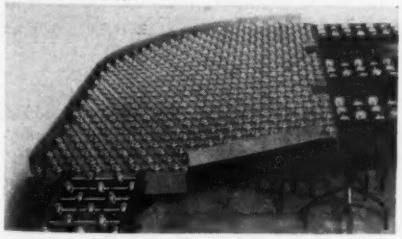


table makes it possible to handle loads as great as 10,000 pounds.

Installation of the unit, possible in all types of conveyors, allows the removal of articles for inspection or other purposes without interrupting the continuous flow. It may be used where several conveyors or line are to converge into one. Tables are built to individual requirements and specifications.

Check No. 2 on Reply Card for more Details

High Frequency Heaters

Redesigned high frequency heating units which include a new all steel frame base and panel construction, are being offered by Lepel High Frequency Laboratories Inc., 39 West 60th St., New York, N. Y., in 7½, 15 and 30 kilowatt ratings. Unit interiors are of the latest fire resisting

materials. Operating controls are arranged for greater convenience.

Other changes include improvements in spark gap holders and use of fiber glass insulation in the high voltage of the main transformer. Units are applicable for high frequency heating on ferrous or nonferrous materials. Without any auxiliary equipment, they can be used for hardening, annealing, stress relieving, brazing, soldering and welding.

Check No. 3 on Reply Card for more Details

Weighing Instrument

Developed by Fisher Scientific Co., Pittsburgh 19, Pa., and Eimer & Amend, New York 14, N. Y., the Gram-atic balance uses a direct reading analytical balance and has but one pan. All weighings are made under constant load. The complete final weight is read directly from the scales on the panel and the last three decimal places are indicated automatically.

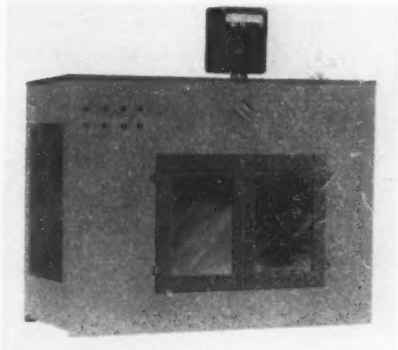
A feature which facilitates fast weighing is the rapid manipulation of the weights by means of control knobs on the front panel. As weights up to 0.1-gram are removed by the control knobs, their corresponding figures appear on the direct reading scales. The weight less than 0.1-gram is indicated optically and auto-

matically on the illuminated screen. Power source is built into the instrument. The weighing compartment is closed by sliding glass doors.

Check No. 4 on Reply Card for more Details

Laboratory Ovens

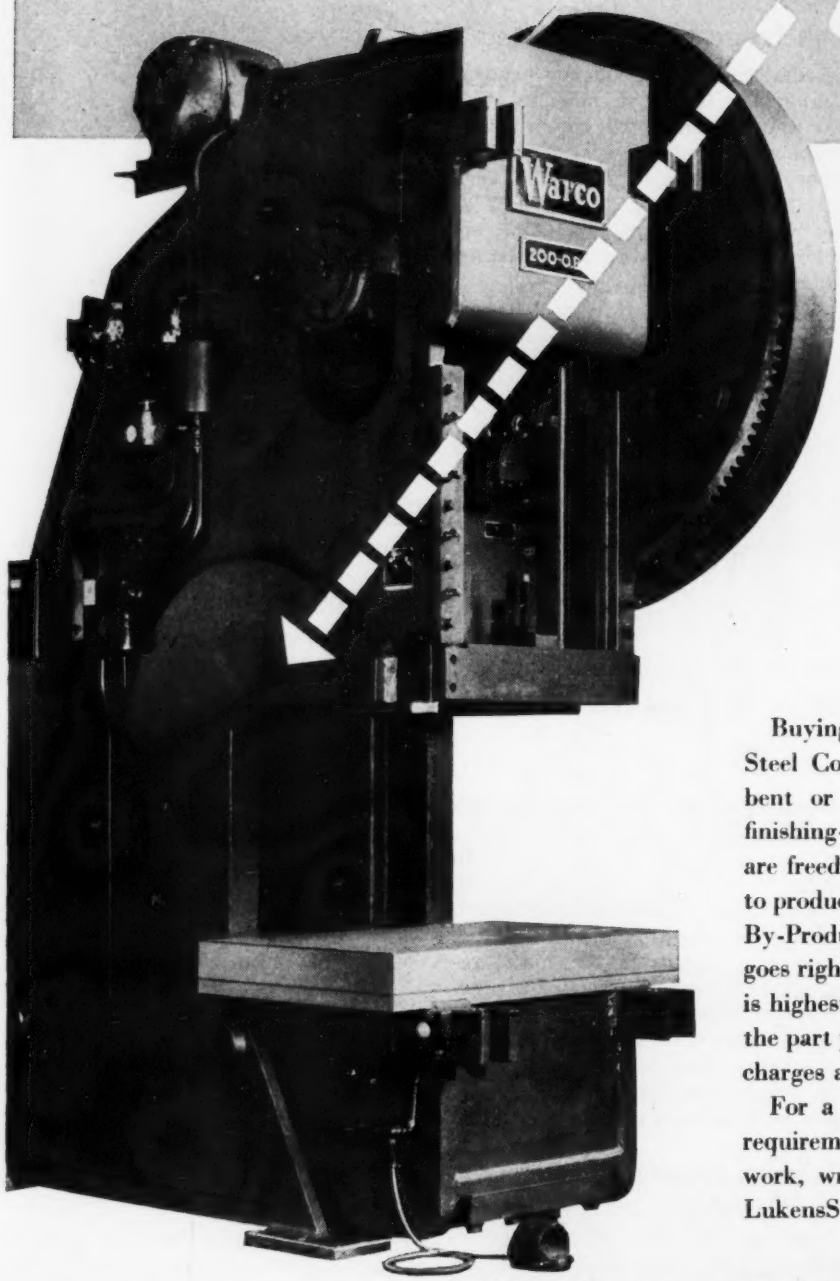
Eight 1350 watt Chromolox resistance fin strip heating elements are employed in the model KHD-145 laboratory oven, largest in a standard line introduced by K & H Industrial Products Inc., 459 Morgan Ave., Akron 11, O. It has interior dimensions of 30 x 40 x 22 inches. Features in-



clude controlled forced air flow to assure uniform heat distribution throughout the oven chamber.

Three-inch thick magnesia block insulation saves heat. Double access doors have two thicknesses of heat resisting glass separated by a ¾-inch air space. Safety features include flush-mounted switches and indicating lights and electrical circuits that are automatically broken when oven doors are opened or when squirrel

THEY CALL IT A "doubler plate"



Called a "doubler plate" because it doubles the thickness of the side frame around the throat, that C-shaped section doubles the strength of the press where the stresses are highest. It is welded to the large plate, becoming an integral part of the side frame.

By-Products Steel Co. is a supplier of these side frame and doubler plates, cut from 1" to 2½" plate, for 50 to 200-ton presses built by Warco Press Division of Federal Machine & Welder Company, Warren, Ohio.

Buying steel plate shapes from By-Products Steel Co.—flame-cut, sheared, pressed, blanked, bent or formed in other ways and ready for finishing—offer these advantages: Your facilities are freed for other fabrication work, enabling you to produce more on less plant investment. Because By-Products Steel Co. cuts out the parts, scrap goes right to Lukens open hearths where its value is highest. You pay freight only on the weight of the part you want. Your scrap losses and handling charges are lower.

For a quotation on your steel plate product requirements, or for Bulletin 270 illustrating our work, write By-Products Steel Co., Division of LukensSteel Co., 414 Strode Ave., Coatesville, Pa.

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STEEL PLATE SHAPES

FLAME-CUT ★ SHEARED ★ PRESSED ★ BENT ★ BLANKED ★ WELDED

cage type blower does not function. Other ovens (in sizes 30 x 22 x 22 and 18 x 18 x 18 inches) can be furnished in bench or floor models.

Check No. 5 on Reply Card for more Details

Welding Machine

Air operated, and of the press type, the direct action projection welding machine, designated as type PT-0 by Acme Electric Welder Co., 2618 Fruitland Rd., Los Angeles 11, Calif., is offered in either 20, 30 or 40 kilowatt-ampere models. Horn adapters and

horns to convert for conventional spot welding are available.

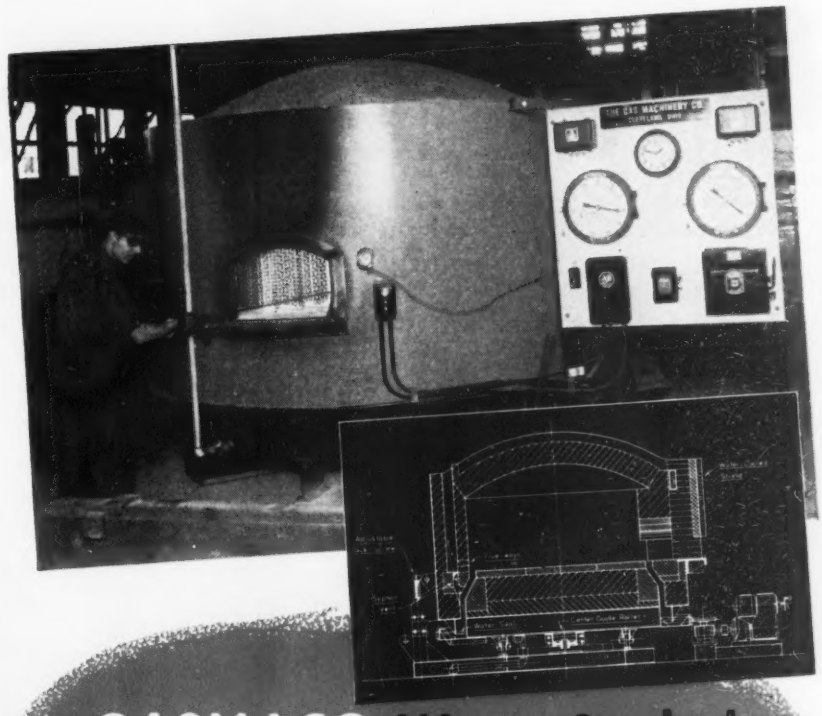
Developed for light welding jobs where speed is desirable, the machine has a solenoid operated air valve with either a single or two-stage foot switch. Standard throat length is 6 inches. When converted to a spot welder, the measurement is increased to 12 inches.

Check No. 6 on Reply Card for more Details

Tap Grinder

Announced by Gallmeyer & Livingston Co., Grand Rapids, Mich., is the model 2D-1 tap grinder which has a capacity from No. 6 to 3-inch taps. It is of the double-end spindle type and two taps may be ground at the same time on the two wheels. Pipe, pulley, nut, tapper, hand and machine taps with two, three, four, five or six flutes may be ground. Threads may be A.S., S.A.E., V.S.A.E., Acme, square, etc. A special attachment for bent shank taps is available.

Any desired angle of entrance taper at the point of the tap may be ground. Whatever the angle, all flutes will be ground the same. A diamond truing device with two diamonds is furnished as part of the standard equipment. The spindle is equipped with double-row ball bearings cap-



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The floating hearth plates (patent applied for) prevent warpage and maintain a uniform load on each roller. Another and very important feature is the water sealed hearth using patented syphon vents (illustrated in drawing above) to short circuit any water vapor, formed above seal, directly to the flue ways.

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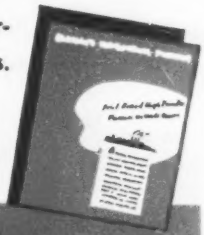

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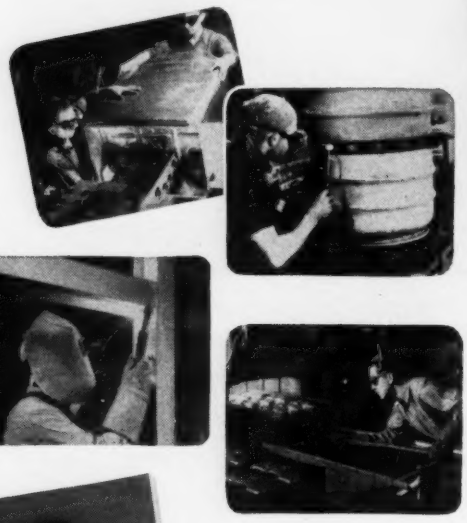

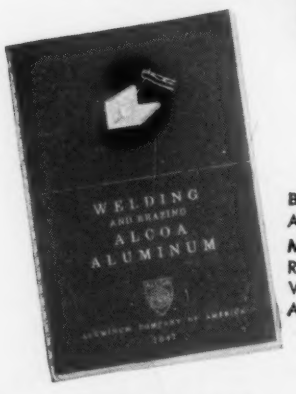

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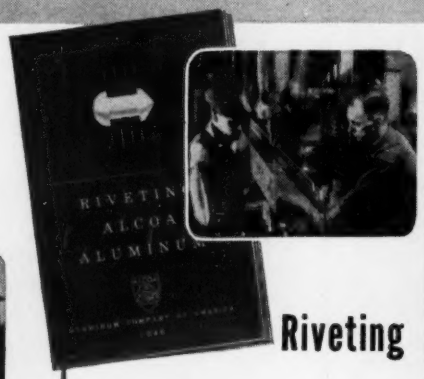

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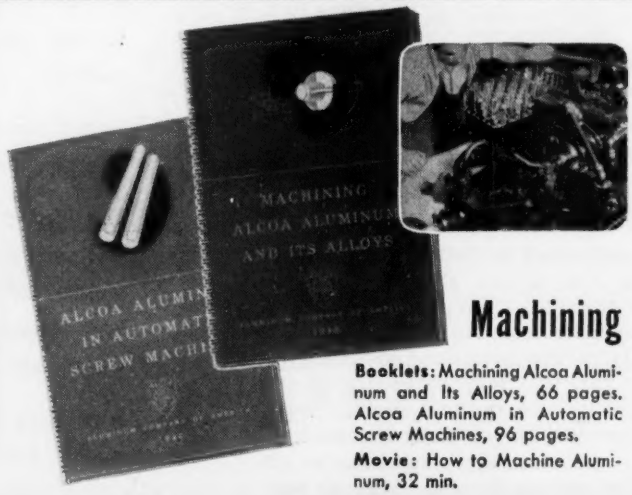

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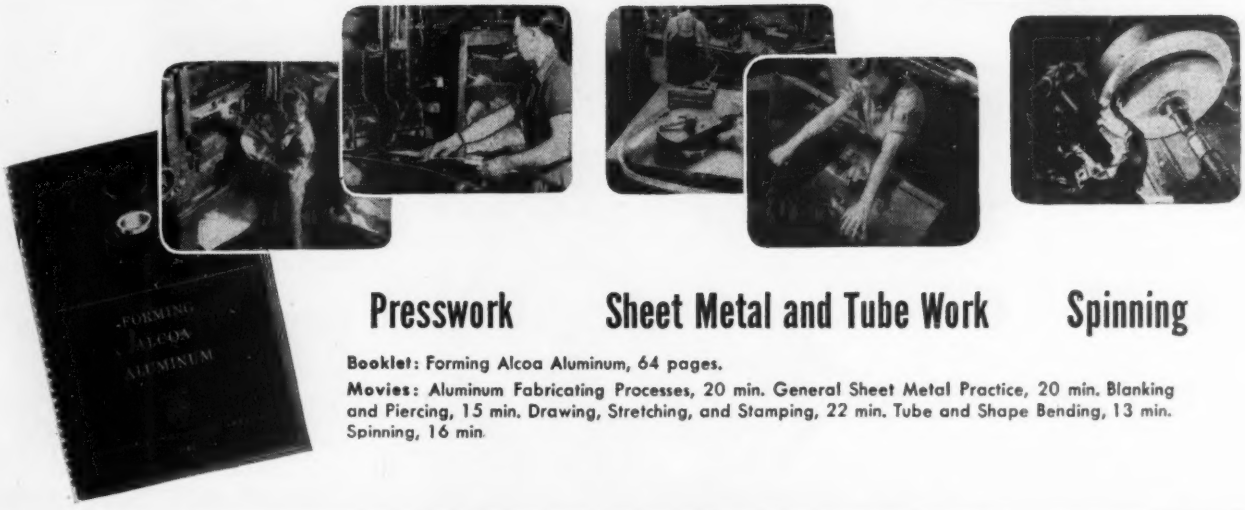

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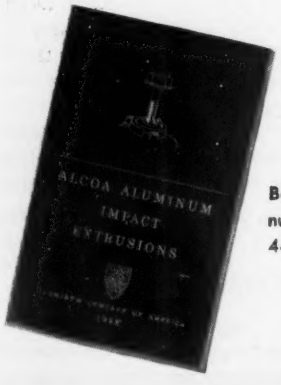
Impact Extrusions



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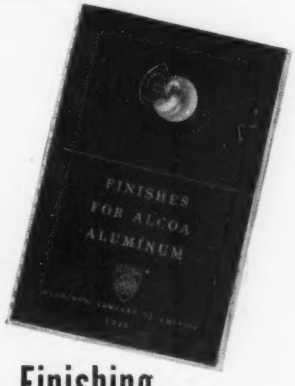

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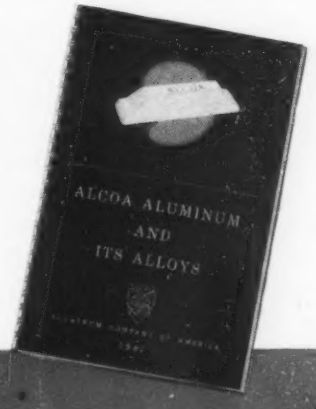

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A large manufacturer of rules and steel tape measures uses two types of pre-coated ThomaStrip in the products shown here. The clamps (hinges) of the rules are made of brass coated ThomaStrip, and this brass coating serves as an ultimate finish. Here pre-coated ThomaStrip eliminates costly plating operations after forming.

The tape measure cases are made of copper coated ThomaStrip, and in this application the copper serves as a lubricant for the dies, a rust protection during fabrication, and a base for further plating.

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ThomaStrip
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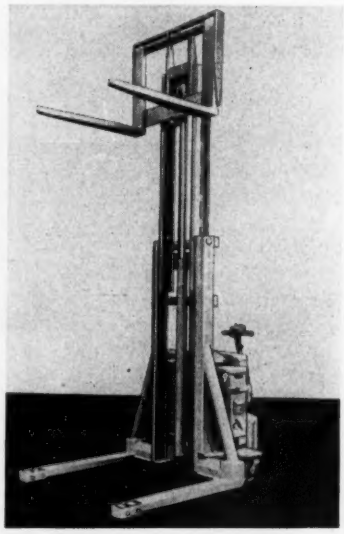
able of resisting heavy combined radial and thrust loads. It is driven through V-belts from a 1½-horsepower motor.

Check No. 7 on Reply Card for more Details

Stacking Truck

Capacities up to 4000 pounds may be handled by the electrically operated telescopic Jackstacker, built by Lewis-Shepard Products Inc., 274 Walnut St., Watertown 72, Mass. It is designed for the movement and high stacking of materials on skid platforms, pallets or in sectional bins. Counterweighted, straddle type, open-end base and platform type models are offered for handling single or double-faced pallets as well as skids or platform type containers.



All controls are operated from the handle head with handle in vertical or any other position. Operator never has to leave his position to maneuver or raise or lower the load. The truck has two speeds forward and reverse. Master drive unit and traction mechanism are mounted on articulated linkage, insuring adequate traction over uneven surfaces, ramps and sills.

Check No. 8 on Reply Card for more Details

General Purpose Turbine

Industrial pumps, fans, blowers, compressors and small generators may be driven by the Typee all weather general purpose turbine, announced by Westinghouse Electric Corp., P. O. Box 868, Pittsburgh 30, Pa. Three wheel sizes, 16, 20 and 25-inch, permits their application over a range of 5 to 1500 horsepower with steam conditions up to 600 pounds at 750° F and speeds of 1000 to 7000 revolutions per minute.

Combination felt and labyrinth bearing seals protect the lubricating

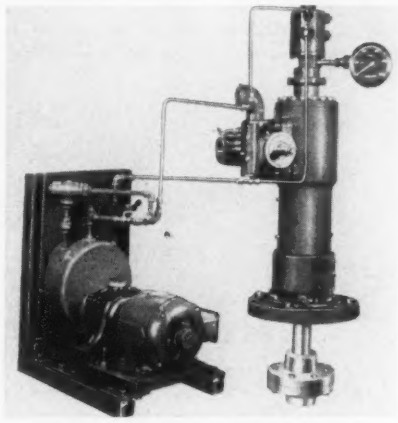
system from contamination. An overspeed trip simultaneously closes the governor valve and a heavy butterfly valve at a predetermined speed. The basic turbine is equipped with a shaft-type governor, mounted in a casing that completely protects governor assembly and shaft end.

Check No. 9 on Reply Card for more Details

Variable Speed Drive

Hydraulics Division of Rockwell Mfg. Co., Pittsburgh 22, Pa., is producing variable speed hydraulic drives with motor integrated to extension shaft and with a special mechanical seal for pressure vessel application. The system uses pumps and motors of the Rotocycle design as the hydraulically coupled activating mediums. Motors may be located remotely from the pumps and the hydraulic circuit can be arranged so that several motors are supplied with fluid pressure from one central pumping source.

A Hydro-syn governing system is used to maintain a constant predetermined speed. The desired speed is set by adjusting a main circuit control valve. Speed is maintained through the functioning of a hydraulic control circuit that operates on the constant pressure differential principle through the pilot valve. Drives can be furnished in speed ranges up



to 5000 revolutions per minute and in ratings from fractional to 125 horsepower or greater.

Check No. 10 on Reply Card for more Details

Tilting Frame

Stearns Magnetic Mfg. Co., Milwaukee 4, Wis., is announcing a tilting frame as auxiliary equipment for its grinder holding magnets which are designed to grip castings and other material and save time in preparing jigs and clamping devices. The frames allow for positioning work in a 30 degree arc and will accommodate grinder holding magnets of 16 x 14, 16 x 24 and 16 x 40 inches.

Magnets can be energized or de-energized by suitable hand or foot switches from direct current voltage wound to suit requirements. Where tilting cradle is desired for holding magnets already in operation, size of the magnet should be known.

Check No. 11 on Reply Card for more Details

Demounting Press

All types of wheel sets may be handled without the use of spacers on the new demounting press designed by Watson-Stillman Co., Roselle, N. J. The double-end machines, with 54-inch clearance between bars and a stroke at each end of 26 inches, are available in 400 and 600 ton sizes. Wheels may be demounted at the rate of one per minute.

Diesel wheels may be demounted on a production basis without disturbing the drive gear. Single station pushbutton controls initiate all movements of the press. Rapid traverse is provided for all idle portions of the stroke. The press can also be used for mounting car wheels and

PITTSBURGH PIPE DISCOVERS TOPFLIGHT

"Only satisfactory label, in fact it's ideal"

Pittsburgh Pipe and Coupling Company of Allison Park, Pa., believe that the best advertising they can do is to leave a sample of one of their products with engineers, plant managers and purchasing agents. To make sure that their samples will not only attract immediate admiration but also be identified when purchases are made, Pittsburgh Pipe tried many types of labels, all of which became unstuck.

Enter Topflight

Now every sample coupling mailed or handed out by salesmen carries a lustrous cellophane label. In a majority of cases the coupling stays on executives' desks because of the attractive label, acts as paperweight and show piece, and a handy reference when orders are placed.

TOPFLIGHT TAPE COMPANY

ERWIN HUBER, *President*

YORK PENNA.

axle assemblies. All gages and record-instruments necessary for operation are included as standard equipment.

Check No. 12 on Reply Card for more Details

Bench Grinder

The ¼-horsepower bench type grinder, announced by Torq Electric Corp., 1083 Interstate St., Bedford O., is designed for grinding, buffing, tool sharpening, polishing, wire brushing and light production. It is furnished with two 6 x ¾-inch wheels, one coarse, one fine.

Adjustable tool rests permit contact with wheel at any desired angle. Wheel guards and transparent eye shields provide operator protection. Motor is a standard Torq single phase, 110-volt, 60-cycle model. Operating speed is 3450 revolutions per minute.

Check No. 13 on Reply Card for more Details

Dust Collector

Dust from small grinding and sanding wheels and lint from buffing and polishing operations can be collected with the portable, self-contained dust collector produced by Aget-Detroit Co., 418 Main at Washington Sts., Ann Arbor, Mich. The compact (12 x 14 x 18 inches high) model 335 Dustkop may be installed on or under a bench.

A rating of 320 cubic feet per minute at 1½-inches water lift on a 3-inch inlet is developed by a continuous duty, 3600 revolutions per minute, ⅓-horsepower motor. A self-clearing paddle wheel fan is directly driven by the motor. After passing through the fan, the dust laden air is directed over the surface of the dust collecting tray which filters out the lint, chips, wire and heavier dusts. A spun glass filter provides second stage cleaning before the air is returned to the working space.

Check No. 14 on Reply Card for more Details

Electronic Heater

Controlled rapid brazing, soldering and heat treating of metals is possible with the model 3000-B high frequency heater developed by Radio Frequency Corp., Boston 34, Mass. In operation it produces a magnetic field which oscillates about 500,000 times per second. Accurate control makes it possible to produce the right amount of heat to braze or solder parts in high speed production. Maximum output is 3000 watts. Unit is supplied with tubes, timer, foot switch and power cord.

Check No. 15 on Reply Card for more Details

Hydraulic Press

Variation of both daylight and column spacing from standard specifications with a minimum amount of engineering and machining is a feature of the 2-column hydraulic press offered by Hufford Machine Works Inc., Redondo Beach, Calif. Available in capacities from 10 to 200 tons, the press can be converted to a wide range of operations in various industries. The standard 2-C model is

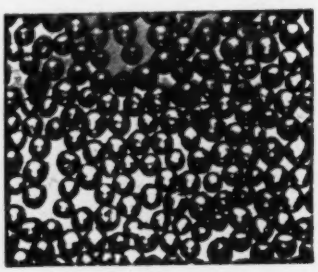
ACCEPTED
BY AMERICA'S LARGEST INDUSTRIAL PLANTS TO DO THE TOUGHEST BLASTING AND PEENING OPERATIONS

HI-GRADE METALLIC

FAMOUS
FOR ITS ABILITY TO STAND UP UNDER REPEATED HARD USE

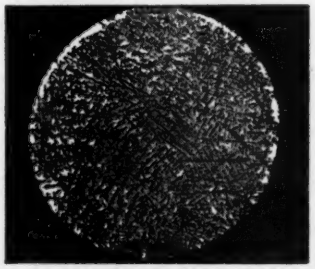
SHOT
- ROUND
- UNIFORM IN SIZE
- UNIFORM IN HARDNESS
- LACKS IRREGULAR SHAPES

GRIT
- RECTANGULAR
- SHARP
- TOUGH
- DURABLE

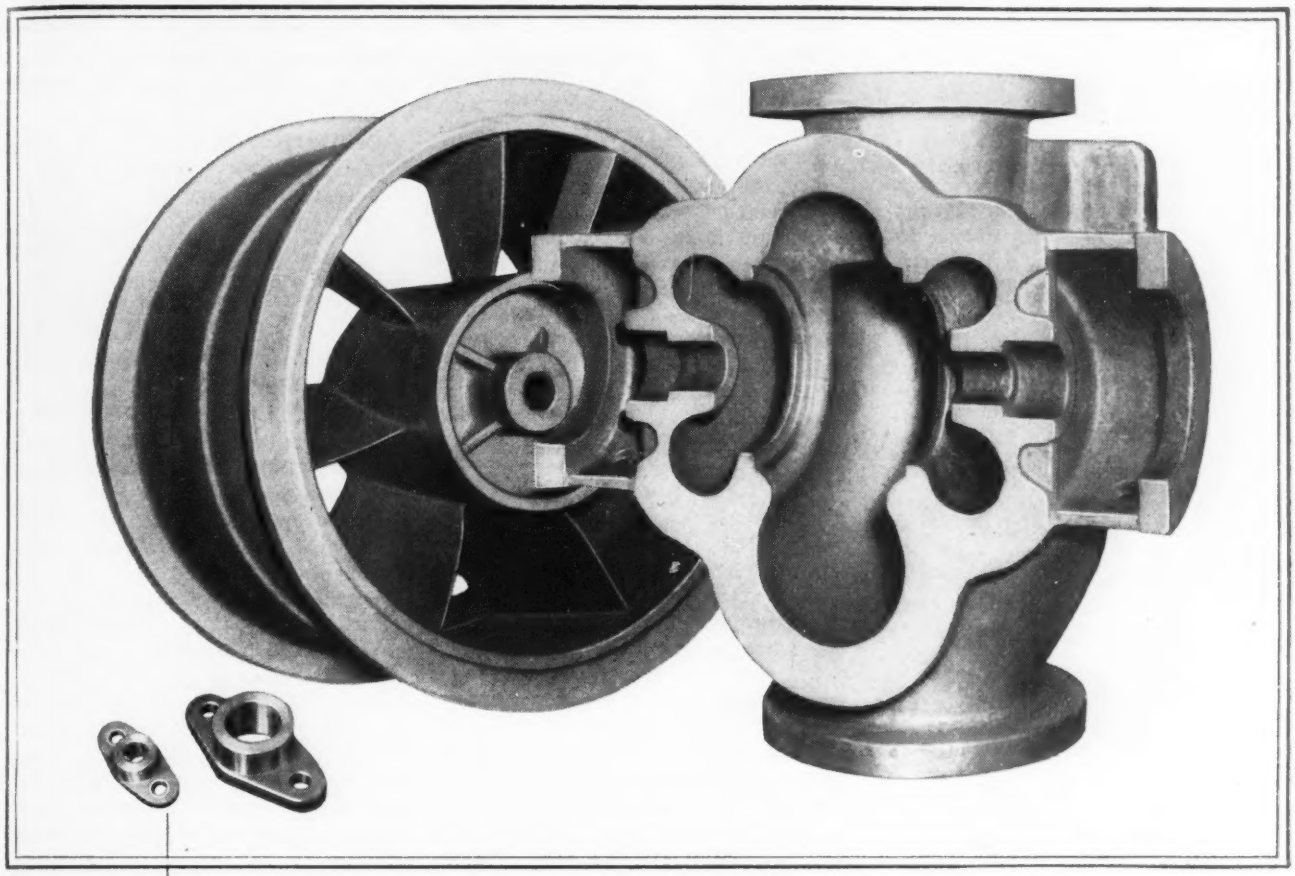


UNRETOUCHED PHOTO OF HI-GRADE SHOT

CLAYTON-SHERMAN ABRASIVES COMPANY
3896 LONYO ROAD
DETROIT 10, MICHIGAN
CEdar 7200



MICROSCOPIC STRUCTURE OF METAL



"Custom-Engineered" Castings — for Long Range Economy

For longer, more economical service, N-B-M non-ferrous structural castings are tailor-made to your own specific application

Seldom are two structural casting problems precisely the same. A pump housing, for instance, presents certain requirements, while an impeller may call for a completely different alloy and casting technique.

Because of these innumerable combinations, N-B-M engineers make a specialty of research and manufacturing development — an approach that in the last 74 years has built up a tremendous backlog of experience in solving the most complex problems of casting design.

The unique engineering service of National Bearing Division includes a complete study of the important factors involved in each casting application. The unvarying result of this N-B-M service is to find the answers to such problems as:

The Proper Alloy—for long, trouble-free service and increased resistance to corrosion.

The Proper Casting Design—for a high factor of strength to handle safely the projected loads, pressures and stresses.

The Proper Casting Technique—for close tolerances consistent with maximum economy and ease of finished machining operations.

Any successful application of a structural part—large or small — depends on the correct solution to these basic problems of design. Let the specialized approach and broad experience of National Bearing Division find the right answers for you.

N·B·M

AMERICAN Brake Shoe COMPANY

NATIONAL BEARING DIVISION

ST. LOUIS • NEW YORK

PLANTS IN: ST. LOUIS, MO. • MEADVILLE, PA. • NILES, OHIO • PORTSMOUTH, VA. • ST. PAUL, MINN. • CHICAGO, ILL.

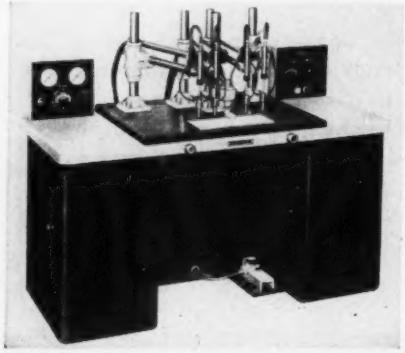
equipped for manual operation but can easily be converted to semiautomatic or completely automatic operation with the addition of standard accessories.

Either single or multiple ram action is possible for opposed pressing, ejection, die charging, off-bearing, etc. An automatic timing unit is offered which produces any desired sequence of operations. Optional construction features include moving and guided platens attached to ram, rotating tool facilities, variable work clearance (either vertical or horizontal), optional table height and ease of tool attachment.

Check No. 16 on Reply Card for more Details

Stud Welder

Principle of the new stud welding process developed by Graham Mfg. Corp., 1643 National Bank Bldg., Detroit 26, Mich., is as follows: Studs, on coming in contact with the work and fusing, cause ionization which, in turn, allows a path for main discharge current of the capacitor to form an arc sufficient to melt both the full diameter of the stud end and the work piece under it. This is followed by a hammer blow causing the pieces to weld.



A capacitor-operated, self-timed device, the welder's complete cycle is brought about by a rapid, continuous movement of the stud-holding part. Time of arc is about 1 mil-second, making possible use of very high currents and use on thin metal without distortion. Studs may be up to ½-inch. Welding pressure is mechanical or pneumatic. Portable and stationary units are available.

Check No. 17 on Reply Card for more Details

• • •

DRAFTING MACHINE: Emmert Mfg. Co., Waynesboro, Pa., announces a new, stainless steel drafting machine that will operate in any position from true horizontal to true vertical. Indexing of angles is fast and easy through use of the micromatic quadrant which allows indexing of every 3 degrees by "flipping" the quadrant minute adjusting screw into desired degree setting and adjustments as fine as 2½ minutes by a slight turn of the adjusting screw.

Check No. 19 on Reply Card for more Details

HYDRAULIC SYSTEM SOLVENT: Swan-Finch Oil Corp., New York, offers Hydro-Solv A for removing gum, sludge and other contaminants from hydraulic systems. Left in the system for 100-150 working hours, it dissolves all contaminates which are removed when system is drained.

Check No. 20 on Reply Card for more Details

ELECTRICAL CONTACT METAL: Fasaloy 99, announced by Fansteel Metallurgical Corp., North Chicago, Ill., is a new electrical contact metal having the desirable properties of fine silver and a substantially higher "no-weld" current value. It is well suited for uses were relatively low operating pressures and high temperatures are encountered and where circuits of relatively high amperage are made and broken.

Check No. 21 on Reply Card for more Details

ROTARY MAGNETS: Improved design of the nonelectric Multilift rotary magnets manufactured by Multifinish Mfg. Co., Detroit 7, Mich., provides increased carrying capacity, efficient releasing in retrieving from tanks, separating ferrous from nonferrous materials, picking up steel from floors, or nails from parking lots, cleaning tramp iron from conveyors and other purposes. These units retain strength without charging and require no wires or electricity.

Check No. 22 on Reply Card for more Details

COMBUSTION TEST SET: Set tells at once whether a heating installation—gas, oil or stoker—is correctly functioning. Manufactured by F. W. Dwyer Mfg. Co., Chicago, set includes a new style CO_2 indicator, a small precision draft gage and a pencil type stack thermometer which with the accessories permits every necessary test to be made.

Check No. 22 on Reply Card for more Details

HARD SURFACING ELECTRODES: Two new electrodes of the coated tubular type for depositing super-abrasion resisting surfaces of weld metal are announced by Lincoln Electric Co., Cleveland, O. Tungweld-C is a tubular, light coated electrode which contains in the tube coarse particles of tungsten carbide. Tungweld-F is a shielded arc tubular electrode containing fine particles of tungsten carbide. Both are available in 14-inch length in ¼-inch size, packed in 5 pound containers.

Check No. 23 on Reply Card for more Details

COLOR BUFFING COMPOSITIONS: Hanson-Van Winkle-Munning Co., Matawan, N. J., announces a new bar composition for color buffing carbon steel, stainless steel and chromium plate. Designated as 6-B-72, it has a binder that retains the abrasive on the buff face for a greater period of time permitting it to do its cutting and does not build up a heavy waxy face that prevents a high color free from casts.

Check No. 24 on Reply Card for more Details

SAFETY CONTROL: No. 157, a new safety control that offers a self-contained water column for high pressure boilers is announced by McDonnell & Miller Inc., Chicago, Ill. Designed for maximum steam pressure of 150 pounds, it is the No. 150 in a new water-column form and makes available low water cut-off, pump control, and low water alarm or any combination of these functions.

Check No. 25 on Reply Card for more Details

FOR MORE INFORMATION
on the new products and equipment in this section, fill in a card. It will receive prompt attention.

Market Summary

STEEL SUPPLY— There is little in the steel market outlook to inspire optimism over coming months on the part of general consumers. Despite record peacetime production steel supply is falling far short of requirements, and no easing is likely in this respect for the foreseeable future. This is especially true with the defense program scheduled to be stepped up sharply after the turn of the year.

While a little better balance between supply and demand is appearing in certain consumer durable goods lines, steel requirements in other directions are overwhelming. Demands of the oil and gas industry, for instance, are described as fantastic.

ALLOCATIONS— Considerable uncertainty surrounds the voluntary allocations program. Indications are few, if any, additional preferences will be granted new claimants for assistance, since the law under which allocations are made possible is scheduled to expire at the end of February and there is no certainty it will be extended. At the same time, talk in Washington is to the effect mandatory allocations now stand a 50-50 chance of being approved by the new Congress.

PRODUCTION— Under pressure of the greatest peacetime demand in history steelmakers are pushing production to the limit of available raw materials and facilities. Output of ingots and steel for castings last week was the second highest in the industry's history and set a new peacetime peak. The national ingot rate last week rose ½ point to 98.5 per cent of capacity, equivalent to production of about 1,786,300 net tons of ingots and steel for castings. This compares with average weekly output of 1,281,210 tons in 1940, the best prewar production year.

PRICES— Individual producers continue to make adjustments in price schedules but nothing has yet developed to indicate a further general hike in the market is in prospect. Still, consumers are apprehensive another increase will be forthcoming unless the continued rise in production costs is stemmed.

Last week two producers, following the lead of a Pittsburgh interest, revised upward extras for alloy content and size extras for flat alloy bars other than spring steel. Also, several producers of ingot molds advanced prices $3 per ton, reflecting recent advances in pig iron prices.

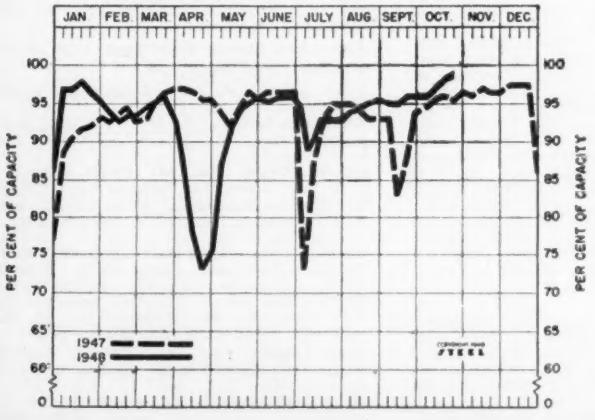
Sheet and strip producers generally are studying advances in extras on hot-rolled sheet and strip recently effected by one midwestern producer but they have not taken action as yet.

COMPOSITES— STEEL's composite price averages held unchanged last week and compared with those for the like 1947 week as follows: Finished steel, $95.05 and $75.41; semifinished steel, $75.75 and $56.80; steelmaking pig iron, $46.29 and $36.17; steelmaking scrap, $43.33 and $42.58.

RAW MATERIALS— Shipments of pig iron show some improvement and the supply outlook for next year is reported more encouraging with much furnace repair work likely to be completed within the next month or so. Currently, supply conditions are extremely tight despite some falling off in certain castings demand and a steady, but small, inflow of foreign iron.

At the same time scrap appears in slightly better supply though threat of a shortage has not been eliminated. Some steelmakers are holding larger inventories than for months past. Here and there, an exceptionally tight situation prevails, at Buffalo, for instance, where material is reported moving out of the district to other points above formula prices. Some German scrap is coming into the country and shipments will increase over coming months. However, the total received from abroad will not likely exceed 1 million tons over the next 12 months.

STEELWORKS OPERATIONS



DISTRICT STEEL RATES

Percentage of Ingot Capacity engaged in Leading Districts

	Week Ended Oct. 23	Change	Same Week 1947	Same Week 1946
Pittsburgh	96	— 0.5	104	97.5
Chicago	98.5	+ 1	95	91.5
Eastern Pa.	95	+ 1	91.5	78
Youngstown	104	None	92	91
Wheeling	91	+ 1	93.5	93.5
Cleveland	99	+ 0.5	90	66
Buffalo	104	None	88.5	88.5
Birmingham	100	None	99	99
New England	87	None	84	89
Cincinnati	103	None	87	84
St. Louis	89.5	None	74	61
Detroit	101	None	86	92
Estimated national rate	98.5	+ 0.5	95.5	90

Based on weekly steelmaking capacity of 1,802,476 net tons for 1948; 1,749,928 tons for 1947; 1,762,381 tons for 1946.

COMPOSITE MARKET AVERAGES

Arithmetical Price Composites*

	Oct. 23	Oct. 16	Month Ago Sept. 1948	Year Ago Oct. 1947	5 Years Ago Oct. 1943
Finished Steel	$95.05	$95.05	$95.05	$75.41	$56.73
Semifinished Steel	75.75	75.75	75.75	56.80	36.00
Steelmaking Pig Iron	46.29	46.29	44.39	36.18	23.00
Steelmaking Scrap	43.33	43.33	43.33	39.85	19.17

FINISHED STEEL WEIGHTED COMPOSITE†

Sept. 1948	4.12679c
Aug. 1948	4.14340c
July 1948	4.06995c
Sept. 1947	3.45716c
Sept. 1943	2.44293c

***STRAIGHT ARITHMETICAL COMPOSITES:** Computed from average industry-wide mill prices on Finished Carbon Steel (hot-rolled sheets, cold-rolled sheets, cold-rolled strip, hot-rolled bars, plates, structural shapes, basic wire, standard nails, tin plate, standard and line pipe), on Semifinished Carbon Steel (re-rolling billets and slabs, sheet bars, skelp, and wire rods), on Basic Pig Iron (at eight leading producing points), and on Steelworks Scrap (No. 1 melting grade at Pittsburgh, Chicago and eastern Pennsylvania). Steel arithmetical composites, dollars per net ton; pig iron and scrap, gross ton.

†FINISHED STEEL WEIGHTED COMPOSITE: Computed in cents per pound, mill prices, weighted by actual monthly shipments of following products, representing about 82 per cent of steel shipments in the latest month for which statistics are available, as reported by American Iron & Steel Institute: Structural shapes; plates, standard rails; hot and cold-finished carbon bars; black butt weld pipe and tubes; black lap weld pipe and tubes; black electric weld pipe and tubes; black seamless pipe and tubes; drawn wire; nails and staples; tin and terne plate; hot-rolled sheets; cold-rolled sheets; galvanized sheets; hot-rolled strip; and cold-rolled strip. September, 1948, figure is preliminary.

COMPARISON OF PRICES

Representative market figures for current week; average for last month, wire rods, cents per lb; semifinished (except wire rods) and coke, dollars three months and one year ago. Finished material (except tin plate) and per net ton, others dollars per gross ton. Delivered prices represent lowest from mills.

Finished Materials

	Oct. 23, 1948	Sept., 1948	July, 1948	Oct., 1947
Steel bars, Pittsburgh mills	3.45c	3.45c	3.105c	2.90c
Steel bars, del. Philadelphia	3.79	3.79	3.545	3.301
Steel bars, Chicago mills	3.35	3.35	3.065	2.90
Shapes, Pittsburgh mills	3.275	3.275	2.975	2.80
Shapes, Chicago mills	3.25	3.25	2.965	2.80
Shapes, del. Philadelphia	3.48	3.48	3.18	2.947
Plates, Pittsburgh mills	3.50	3.50	3.155	2.95
Plates, Chicago mills	3.40	3.40	3.115	2.95
Plates, del. Philadelphia	3.71	3.71	3.41	3.162
Sheets, hot-rolled, Pittsburgh mills	3.275	3.275	2.975	2.80
Sheets, cold-rolled, Pittsburgh	4.00	4.00	3.70	3.55
Sheets, No. 10 galv., Pittsburgh	4.40	4.40	4.10	3.90
Sheets, hot-rolled, Gary mills	3.25	3.25	2.965	2.80
Sheets, cold-rolled, Gary mills	4.00	4.00	3.70	3.55
Sheets, No. 10 galv., Gary mills	4.40	4.40	4.10	3.90
Strip, hot-rolled, Pittsburgh mills	3.50	3.50	3.140	2.80
Strip, cold-rolled, Pittsburgh mills	4.375	4.375	3.965	3.55
Bright basic, wire, Pittsburgh	4.325	4.325	3.965	3.675
Wire nails, Pittsburgh mills	5.775	5.775	5.255	4.25
Tin plate, per base box, Pitts. dist.	$6.70	$6.80	$6.74	$5.75

Semifinished

Sheet bars, mill	$67.00*	$67.00*	$62.80	$53.57
Slabs, Chicago	52.00	52.00	47.80	40.18
Rerolling billets, Pittsburgh	59.00	59.00	47.80	40.18
Wire rod 7/32 to ¼-inch, Pitts. dist.	3.775c	3.775c	3.415c	2.925c

* Nominal.

Pig Iron

	Oct. 23, 1948	Sept., 1948	July, 1948	Oct., 1947
Bessemer, del. Pittsburgh (N.&S. sides)	$48.08	$48.08	$44.08	$38.879
Basic, Valley	46.00	43.00	40.60	36.00
Basic, eastern del. Philadelphia	50.17	47.77	43.77	38.78
No. 2 fdry., del. Pgh. (N.&S. sides)	47.58	47.58	43.58	37.379
No. 2 fdry., del. Philadelphia	50.67	48.27	44.27	39.28
No. 2 foundry, Chicago	44.75	43.25	41.10	36.00
No. 2 foundry, Valley	46.50	43.50	41.10	36.50
Southern No. 2 Birmingham	43.38	43.38	40.72	34.88
Southern No. 2 del. Cincinnati	49.09	49.09	46.43	38.544
Malleable, Valley	46.50	43.50	40.30	36.50
Malleable, Chicago	45.00	43.50	41.50	36.50
Charcoal, low phos., fob Lyles, Tenn.	66.00	62.00	59.60	46.40
Ferromanganese, fob Aetna, Pa.	163.00	148.00	151.15*	151.00*

* F.o.b. cars Pittsburgh.

Scrap

Heavy melt. steel, No. 1, Pittsburgh	$42.75	$42.75	$40.75	$39.90
Heavy melt. steel, No. 2, E. Pa.	41.50	41.50	40.00	39.50
Heavy melt. steel, No. 1 Chicago	41.75	41.75	40.65	39.55
Heavy melt. steel, No. 1 Valley	42.75	42.75	40.75	39.50
Heavy melt. steel, No. 1, Cleveland	42.25	42.25	40.25	38.25
Heavy melt. steel, No. 1 Buffalo	48.25	48.15	44.30	39.00
Rails for rerolling, Chicago	64.50	64.50	57.80	51.00
No. 1 cast, Chicago	70.50	71.10	68.50	46.40

Coke

Connellsville, beehive furnace	$14.50	$14.50	$14.25	$12.15
Connellsville, beehive foundry	17.00	17.00	17.00	14.50
Chicago, oven foundry, ovens	20.40	20.40	19.86	17.50

FINISHED AND SEMIFINISHED IRON, STEEL PRODUCTS

Finished steel quoted in cents per pound and semifinished in dollars per net ton, except as otherwise noted. Prices apply on an individual producer basis to products within the range of sizes, grades, finishes and specifications produced at its plants

Semifinished Steel

Carbon Steel Ingots: Rerolling quality, standard analysis, open market, $100-105 per gross ton. Forging quality $50 per net ton, mill.

Alloy Steel Ingots: $51 per net ton, mill.

Rerolling Billets, Blooms, Slabs: $52 per net ton, mill, except $62, Conshohocken, Pa.; $66, Monessen, Pa.; sales by smaller interests on negotiated basis at $85 per gross ton, or higher.

Forging Quality Billets, Blooms, Slabs: $61 per net ton, mill, except: $68, Conshohocken, Pa., mill.

Alloy Billets, Slabs, Blooms: Rerolling quality, $63 per net ton, mill, except: $70, Conshohocken, Pa.

Sheet Bars: $67 nom., per net ton, mill; sales in open market $110-$115 per gross ton.

Skelp: 3.25c per lb, mill.

Tube Rounds: $76 per net ton, mill; some sellers quoting up to $120 per gross ton.

Wire Rods: Basic and acid open-hearth, 7/32 & ⅝-inch, inclusive, 3.40c per lb, mill, except: 3.65c, Struthers, O.; 3.70c, Worcester, Mass.; 4.05c, Pittsburg, Calif.; 4.10c, Portsmouth, O., Los Angeles; 4.15c, Monessen, Pa. One producer quotes 3.90c, Chicago base. Basic open-hearth and bessemer, not resulphurized, 7/32 to 47/64-inch, inclusive, 3.50c, mill.

Bars

Hot-Rolled Carbon Bars (O.H. only) and Bar-Size Shapes under 3-in. (Base 20 tons one size): 3.35c, mill, except: 3.55c, Ecorse, Mich., Pittsburgh, Monessen, Aliquippa, Pa.; 4.05c, Pittsburg, Torrance, Calif.; 4.10c, S. San Francisco, Los Angeles, Niles, Calif., Portland, Oreg., Atlanta, Seattle; 4.20c, Kansas City, Mo.; 4.25c, Minnequa, Colo.; 5.30c, Fontana, Calif.

Rail Steel Bars: (Base 10 tons): 3.35c, Moline, Ill.; 4.80c, Williamsport, Avis, Pa.

Hot-Rolled Alloy Bars: 3.75c, mill, except: 4.05c, Ecorse, Mich.; 4.80c, Los Angeles; 5.50c, Fontana, Calif.

Hot-Rolled Alloy Bar Shapes: 4.00c, mill.

Cold-Finished Carbon Bars (Base 20,000-39,999 lb): 4.00c, mill, except: 3.95c, Pittsburgh, Cumberland, Md.; 4.20c, Indianapolis; 4.25c, Monessen, Pa.; 4.30c, Ecorse, Mich.; 4.35c, St. Louis; 4.36c, Plymouth, Mich.; 4.40c, Newark, N. J., Hartford, Putnam, Conn., Mansfield, Readville, Mass.; 4.45c, Camden, N. J.; 5.30c, Los Angeles.

Cold-Finished Alloy Bars: 4.65c, mill, except: 4.75c, Monessen, Pa.; 4.85c, Indianapolis; 4.95c, Worcester, Mansfield, Mass., Hartford, Conn.

High-Strength, Low-Alloy Bars: 5.10c, mill, except: 5.40c, Ecorse, Mich.

Reinforcing Bars (New Billet): 3.35c, mill, except: 3.55c, Monessen, Pa.; 4.05c, Pittsburg, Torrance, Calif.; 4.10c, Atlanta, Seattle, S. San Francisco, Los Angeles; 4.25c, Minnequa, Colo. Fabricated: To consumers: 4.10c, Pittsburgh; 4.25c, S. Duquesne, Pa., Gary, Ind., Youngstown; 5.00c, Seattle.

Reinforcing Bars (Rail Steel): 4.65c, Williamsport, Pa., mill; 5.25c, Huntington, W. Va.

Wrought Iron Bars: Single Refined: 8.60c, (hand puddled), McKees Rocks, Pa.; 9.50c, Economy, Pa. Double Refined: 11.25c (hand puddled), McKees Rocks, Pa., 11.00c, Economy, Pa. Staybolt: 12.75c, (hand puddled), McKees Rocks, Pa.; 11.30c, Economy, Pa.

Sheets

Hot-Rolled Sheets (18 gage and heavier): 3.25c, mill, except: 3.25-3.30c, Cleveland; 3.30c, Pittsburgh; 3.45c, Ecorse, Mich.; 3.95c, Pittsburg, Torrance, Calif.; 5.00c, Conshohocken, Pa.; 5.65c, Fontana, Calif.; 6.25c, Kansas City, Mo.

Hot-Rolled Sheets (19 gage and lighter, annealed): 4.15c, mill, except: 4.40c, Alabama City, Ala.; 4.65c, Niles, O., 5.05c, Torrance, Calif., Kokomo, Ind.

Cold-Rolled Sheets: 4.00c, mill, except: 4.20c, Granite City, Ill., Ecorse, Mich., 4.95c, Pittsburg, Calif.

Galvanized Sheets, No. 10: (Based on 5 cent zinc) 4.40c, mill, except: 5.00c, Niles, O.; 5.15c, Pittsburg, Torrance, Calif.; 5.30c, Kokomo, Ind.

Galvannealed Sheets: 4.95c, mill, except: 5.05c, Indiana Harbor, Ind.; 5.55c, Niles, O.; 5.70c, Kokomo, Ind.

Culvert Sheets, No. 16 flat Copper Steel (based on 5-cent zinc) 5.00c, mill, except: 5.40c, Granite City, Ill.; 5.45c, Kokomo, Ind.; 5.75c, Pittsburg, Torrance, Calif.

Copper-Iron: 5.75c, Granite City, Ill.; 5.35c, Irvin, Pa., Gary, Ind.

Aluminized Sheets: Hot-dipped, coils or cut to lengths: 7.75c, Butler, Pa.

Long Ternes, No. 10 (Commercial quality): 4.80c, mill.

Enameling Sheets, No. 12: 4.40c, mill, except: 4.60c, Granite City, Ill.; 4.70c, Ecorse, Mich.; 6.00c, Niles, O.

Silicon Sheets, No. 24: Field: 5.15c, mill. Armature: 5.45c, mill, except: 6.05c, Niles, O. **Electrical:** Hot-rolled, 5.95c, mill, except: 6.05c, Kokomo, Ind.; 6.15c, Granite City, Ill.; 6.55c, Niles, O.

Motor: 6.70c, mill except: 6.90c, Granite City. Dynamo: 7.50c, mill, except: 7.40c, Follansbee, W. Va., Toronto, O.; 7.70c, Granite City, Ill. Transformer 72, 8.05c, mill, except: 7.90c, Follansbee, W. Va., Toronto, O. 65, 8.60c, mill. 58, 9.30c, mill. 52, 10.10c, mill.

High-Strength Low-Alloy Sheets: Hot-rolled, 4.95c, mill, except: 5.25c, Ecorse, Mich., and Conshohocken, Pa., mills.

Galvanized (No. 10), 6.75c, mill.

Cold-rolled, 6.05c, mill, except: 6.35c, Ecorse, Mich.

Strip

Hot-Rolled Strip: 3.25c mill, except: 3.30c, Cleveland, Pittsburgh, Riverdale, Ill.; 3.25-3.35c,* Sharon, Pa.; 3.45c, Ecorse, Mich., Atlanta; 3.60c, Detroit; 3.70c, West Leechburg, Pa.; 4.00c, Pittsburg, Torrance, Calif.; 4.25c, Seattle, S. San Francisco, Los Angeles; 4.20c, Kansas City, Mo.; 4.30c, Minnequa, Colo.; 5.90c, Fontana, Calif. One company quotes 4.90c, Pittsburgh base.

* Wider than 6-in. and 6-in. and narrower, respectively.

Cold-Rolled Strip (0.25 carbon and less): 4.00c, mill, except 4.00-4.25c, Warren, O.; 4.00-4.50c, Youngstown; 4.20c, Ecorse, Mich.; 4.25c, Riverdale, Ill.; 4.40-4.50c, Detroit; 4.50c, New Haven, Conn., West Leechburg, New Castle, Pa., Boston; 4.75c, Dover, O., New Kensington, Pa.; 4.50-5.00c, Trenton, N. J.; 4.80-5.05c, Wallingford, Conn.; 5.75c, Los Angeles; 7.10c, Fontana, Calif. One company quotes 4.55c, Cleveland or Pittsburgh base, and 4.75c, Worcester, Mass., base; another, 5.00c, Pittsburgh base.

Cold-Rolled Alloy Strip: 9.50c, mill, except 9.80c, Worcester, Mass.

High-Strength, Low-Alloy Strip: Hot-rolled, 4.95c, mill, except: 5.25c, Ecorse, Mich., mill. Cold-rolled, 6.05c, mill, except: 6.35c, Ecorse, Mich., mill.

Tin, Terne Plate

Tin Plate: American Coke, per base box of 100 lb, 1.25 lb coating $6.60-$6.80; 1.50 lb coating $6.80-$7.00. Pittsburg, Calif., mill $7.35 and $7.55, respectively, for 1.25 and 1.50 lb coatings.

Electrolytic Tin Plate: Per base box of 100 lb, 0.25 lb tin, $5.80-$6.00; 0.50 lb tin, $6.00-$6.20; 0.75 lb tin, $6.20-$6.40.

Can Making Black Plate: Per base box of 100 lb. 55 to 70 lb basis weight, $5.20-$5.30; 75 to 95 lb basis weight $5.10-$5.20; 100 to 128 lb basis weight, $5.20-$5.30. $5.75-$5.95. $5.65-$5.85, $5.75-$5.95, respectively, Pittsburg, Calif.

Holloware Enameling Black Plate: 29-gage, 4.75c per pound, except: 4.85c, Sparrows Point, Md.; 4.95c, Granite City, Ill.

Manufacturing Ternes (Special Coated): Per base box of 100 lb, $5.90, except $6 Fairfield, Ala.

Roofing Ternes: Per package 112 sheets; 20 x 28 in., coating I.C. 8-lb, $15.50.

Plates

Carbon Steel Plates: 3.40c, mill, except: 3.40-3.60c, Cleveland; 3.45c, Sparrows Point, Md., Johnstown, Pa., Lackawanna, N. Y.; 3.60c, Pittsburgh; 3.65c. Ecorse, Mich.; 3.75c, Coatesville, Pa.; 3.95c, Claymont, Del., Conshohocken, Pa.; 4.30c, Seattle, Minnequa, Colo.; 4.56c, Houston, Tex.; 5.80c, Fontana, Calif.; 6.50c, Harrisburg, Pa.; 6.25c, Kansas City, Mo.

Floor Plates: 4.55c, mill.

Open-Hearth Alloy Plates: 4.40c, mill, except: 5.10c, Coatesville, Pa., mill.

High-Strength, Low-Alloy Plates: 5.20c mill, except: 5.10c, Coatesville, Pa.; 5.30c, Conshohocken, Pa., Sparrows Point, Md., Johnstown, Pa.; 5.65c, Ecorse, Mich., Sharon, Pa.

Shapes

Structural Shapes: 3.25c, mill, except: 3.30c, Bethlehem, Pa., Lackawanna, N. Y., Johnstown, Aliquippa, Pa.; 3.85c, Torrance, Calif.; 4.15c, Minnequa, Colo.; 4.30c, Seattle, S. San Francisco, Los Angeles; 5.75c, Fontana, Calif.

Alloy Structural Shapes: 4.05c, mill.

Steel Sheet Piling: 4.05c, mill.

High-Strength, Low-Alloy Shapes: 4.95c, mill, except: 5.05c, Bethlehem, Johnstown, Pa., Lackawanna, N. Y.

Wire and Wire Products

Wire to Manufacturers (carloads): Bright, Basic or Bessemer Wire, 4.15c, mill, except: 4.00c, Atlanta; 4.25c, Sparrows Point, Md., Kokomo, Ind.; 4.45c, Worcester, Mass.; 4.50c, Monessen, Pa., Minnequa, Colo., Buffalo; 4.70c, Portsmouth, O.; 4.80c, Palmer, Mass.; 5.10c, Pittsburg, Calif.; 5.15c, So. San Francisco; 5.40c, Shelton, Conn. One producer quotes 4.50c, Chicago base; another, 4.50c, Crawfordsville, Ind., freight equalized with Pittsburgh and Birmingham.

Basic MB Spring Wire, 5.55c, mill, except: 5.30c, Portsmouth, O.; 5.65c, Sparrows Point, Md., Monessen, Pa.; 5.85c, Worcester, Palmer, Mass., Trenton, N. J., 6.50c, Pittsburg, Calif.

Upholstery Spring Wire, 5.20c mill, except: 5.30c, Sparrows Point, Md., Williamsport, Pa.; 5.50c, Worcester, Mass., Trenton, N. J., New Haven, Conn.; 6.15c, Pittsburg, Calif.

Wire Products to Trade (carloads): Merchant Quality Wire: Annealed (6 to 8 Gage base), 4.80c, mill, except: 4.90c, Sparrows Point, Md., 4.95c, Monessen, Pa.; 5.10c, Worcester, Mass.; 5.15c, Minnequa, Colo., Kokomo, Ind.; 5.20c, Atlanta; 5.75c, So. San Francisco, Pittsburg, Calif. One producer quotes 5.15c, Chicago and Pittsburgh base; another, 5.20c. Crawfordsville, Ind., freight equalized with Pittsburgh and Birmingham.

Galvanized (6 to 8 Gage base), 5.25c, mill, except: 5.35c, Sparrows Point, Md.; 5.40c, Monessen, Pa.; 5.55c, Worcester, Mass.; 5.60c, Kokomo, Ind., Minnequa, Colo.; 5.65c, Atlanta; 6.20c, Pittsburg, So. San Francisco, Calif. One producer quotes 5.60c, Pittsburgh and Chicago base; another, 5.65c, Crawfordsville, Ind., freight equalized with Birmingham and Pittsburgh.

Nails and Staples: Standard, cement-coated and galvanized nails and polished and galvanized staples, Column 103, mill, except: 105, Sparrows Point, Md., Kokomo, Ind.; 109 Worcester, Mass.; 110 Minnequa, Colo., Atlanta; 117, Portsmouth, O.; 123, Pittsburg, Calif.; 124, Cleveland; 126, Monessen, Pa.; $5.20 per 100 pound keg, Aliquippa, Pa.; $6.75, Conshohocken, Pa., Wheeling, W. Va. One producer quotes column 109, Chicago and Pittsburgh base; another, column 113, Crawfordsville, Ind., freight equalized with Birmingham and Pittsburgh.

Woven Fence (9 to 15½ Gage, inclusive): Column 109, mill, except: 113 Monessen, Pa., Kokomo, Ind.; 116, Minnequa, Colo.; 121 Atlanta; 132, Pittsburg, Calif. One producer quotes column 113, Pittsburgh and Chicago base; another, column 114, Crawfordsville, Ind., freight equalized with Pittsburgh and Birmingham.

Barbed Wire: Column 123 mill, except: 125, Sparrows Point, Md., Kokomo, Ind.; 126 Atlanta; 128 Monessen, Pa.; 130, Minnequa, Colo.; 143, Pittsburg, Calif.; 145, So. San Francisco. One producer quotes 127, Chicago and Pittsburgh base.

Fence Posts (with clamps): Column 114, Duluth; 115, Johnstown, Pa.; 116, Moline, Ill.; 122, Minnequa, Colo.; $123.50 per net ton, Williamsport, Pa.

Bale Ties (single loop): Column 106, mill, except: 103, Fairfield, Ala.; 108, Sparrows Point, Md., Kokomo, Ind.; 110, Atlanta; 113 Minnequa, Colo.; 130, So. San Francisco, Pittsburg, Calif. One producer quotes column 115, Crawfordsville, Ind., freight equalized with Birmingham and Pittsburgh.

Tubular Goods

Standard Steel Pipe: Mill prices in carlots, threaded and coupled, to consumers about $200 a net ton.

In	Butt Weld Blk.	Butt Weld Gal.	In	Butt Weld Blk.	Butt Weld Gal.
⅛	41½	12½	1¼ ...	46½–	27½–
¼	39½	14		49	30
⅜	36	9	1½ ...	47–	28–
½	40½–	20–		49½	30½
	43	22½	2	47½–	28½–
¾	43½–	24–		50	31
	46	26½	2½, 3..	48–	29–
1	46–	27–		50½	31½
	48½	29½	3½ & 4	44½	25

In	Lap Weld Blk.	Lap Weld Gal.	Elec. Weld Blk.	Elec. Weld Gal.	Seamless Blk.	Seamless Gal.
2	39½	20	38½	19	27–	7½–
					38½	19
2½ ..	42½–	23–	41½	22	32½–	13–
	43½	24			41½	22
3	42½–	23–	41½	22	35–	15½–
	43½	24			41½	22
3½ & 4	42½–	23–	43½	24	38½–	19–
	46½	27			43½	24
5 & 6.	42½–	23–	43½	24	38½–	19–
	44½	25			43½	24
7	....	..	....	..	43½	23

Line Steel Pipe: Mill prices in carlots to consumers about $200 a net ton.

In	Butt Weld Blk.	Butt Weld Gal.	In	Butt Weld Blk.	Butt Weld Gal.
⅛	40½	....	1¼ ...	47–	28–
¼	38½	....		48	29
⅜	35	....	1½ ...	47½–	28½–
½	41–	20½–		48½	29½
	42	21½	2	48–	29–
¾	44–	24½–		49	30
	45	25½	2½ & 3	48½–	29½–
1	46½–	27½–		49½	30½
	47½	28½	3½ & 4	43½	

In.	Lap Weld Blk.	Lap Weld Gal.	Elec. Weld Blk.	Elec. Weld Gal.	Seamless Blk.	Seamless Gal.
2	38½	19	37½	18	26–	6½–
					37½	18
2½ ..	41½–	23	40½	21	31½–	12–
	42½				40½	21
3	41½–	23	40½	21	34–	14½
	42½				40½	21
3½-4 .	41½–	22–	42½	23	37½–	18–
	45½	26			42½	23
5 & 6 .	41½–	22	42½	23	37½–	18–
	43½				42½	23
8	45½	..	44½	24	40½–	20–
					44½	24
10 ...	45	..	44	23½	41½–	21–
					44	23½
12 ...	44	..	43	22½	40½–	20–
					43	22½

Standard Wrought Iron Pipe: Mill price in carlots, threaded and coupled, to consumers about $200 a net ton.

In.	Butt Weld Blk.	Butt Weld Gal.	In.	Lap Weld Blk.	Lap Weld Gal.
⅜ ...	+59½	+93	1¼ ..	+22	+50½
½ ...	+20½	+50	1½ ..	+15½	+43
¾ ...	+10½	+39	2	+ 7½	+34
1 and			2½-3½	+ 5	+29½
1¼	+ 4½	+30	4	List	+23½
1½ ..	— 1½	+26½	4½-8	+ 2	+25
2	— 2	+26	9-12.	+12	+34½

Boiler Tubes: Net base c.l. prices, dollars per 100', mill; minimum wall thickness, cut lengths 4 to 24"; inclusive.

O.D. In.	B.W. Ga.	Seamless Hot Rolled	Seamless Cold Drawn	Elec. Weld Hot Rolled	Elec. Weld Cold Drawn
1	13	....	13.39	13.00	13.00
1¼	13	....	15.87	13.21	15.39
1½	13	$15.05	17.71	14.60	17.18
1¾	13	17.11	20.15	16.60	19.54
2	13	19.18	22.56	18.60	21.89
2¼	13	21.37	25.16	20.73	24.40
2¼	12	23.54	27.70	22.83	26.88
2½	12	25.79	30.33	25.02	29.41
2¾	12	27.33	32.14	26.51	31.18
3	12	28.68	33.76	27.82	32.74
3¼	11	33.39	39.29	32.39	38.11
3½	11	35.85	42.20	34.78	40.94
4	10	44.51	52.35	43.17	50.78
4½	9	58.99	69.42	....	....
5	9	68.28	80.35	....	....
6	7	104.82	123.33	....	....

Rails, Supplies

Rails: Standard, over 60-lb; $3.20 per 100 lb. mill.

Light (billet): $3.55-$4.25 per 100 lb, mill.

Light (rail steel): $4.70 per 100 lb., Williamsport, Pa.

Railroad Supplies: Track bolts, treated: $8.50 per 100 lb., mill. Untreated: $8.25, mill.

Tie Plates: 4.05c mill, except: 4.20c, Pittsburg, Calif.; 4.50c, Seattle.

Splice Bars: 4.25c, mill.

Standard Spikes: 5.35c, mill, except: 5.25c, Pittsburgh.

Axles: 5.20c, mill.

Bolts, Nuts

Prices to consumers, f.o.b. midwestern plants. Sellers reserve right to meet competitors' prices, if lower. Additional discounts on carriage and machine bolts, 5 for carloads; 15 for full containers, except tire and plow bolts.

Carriage and Machine Bolts

½-in. and smaller; up to 6 in. in length	35 off
⅝ and ¾ x 6-in. and shorter	37 off
⅝-in. and larger x 6-in. and shorter	36 off
All diameters longer than 6-in.	36 off
Tire bolts	25 off
Plow bolts	47 off
Lag bolts, 6 in. and shorter	37 off
Lag bolts, longer than 6 in.	35 off

Stove Bolts

In packages, nuts separate, 58½-10 off; bulk 70 off on 15,000 of 3-in. and shorter, or 5000 over 3 in., nuts separate.

Nuts

Semifinished hexagon	A.S.A. Light	A.S.A. Reg. and Heavy
⅞-in. and smaller	41 off	....
½-in. and smaller	....	38 off
½-in.-1-in.	39 off	....
⅝-in.-1-in.	....	37 off
1⅛-in.-1½-in.	37 off	35 off
1⅝-in. and larger	34 off	28 off

Additional discount of 15 for full containers.

Hexagon Cap Screws (Packaged)

Upset 1-in. smaller by 6-in. and shorter (1020 bright)	46 off
Upset (1035 heat treated)	
⅝ and smaller x 6 and shorter	40 off
¾, ⅞, & 1 x 6 and shorter	35 off

Square Head Set Screws

Upset 1-in. and smaller	51 off
Headless, ¼-in. and larger	31 off

Rivets

F.o.b. midwestern plants

Structural ½-in. and larger	6.75c
⅞-in. and under	48 off

Washers, Wrought

Fob shipping point, to jobbers ...Net to $1 off

Tool Steels

Tool Steel: Cents per pound, producing plants; reg. carbon 19.00c; extra carbon 22.00c; special carbon 26.50c; oil-hardening 29.00c; high carbon-chromium 52.00c; chrome hot work, 29.00c.

W	Cr	V	Mo	Co	Base Per lb
18	4	1	...	...	90.50c
18	4	2	...	...	102.5c
18	4	3	...	...	114.5c
18	4	2	...	9	168.5c
1.5	4	1	8.5	...	65.00c
6.4	4.5	1.9	5	...	69.50c
6	4	3	6	...	88.00c

RAW MATERIAL AND FUEL PRICES

Minimum delivered prices do not include 3 per cent federal tax

Pig Iron

Per Gross Ton

	Basic	No. 2 Foundry	Malleable	Bessemer
Bethlehem, Pa., furnace	$48.00	$48.50	$49.00	$49.50
Newark, N. J., del.	50.39	50.89	51.39	51.89
Brooklyn, N. Y., del.	....	52.40	52.90	....
Philadelphia, del.	50.17	50.67	51.17	51.67
Birmingham, furnace	42.88	43.38	....	....
Cincinnati, del.	....	49.09	....	....
Buffalo, furnace	*47.00	*47.00	*47.50	48.00
Boston, del.	55.42	55.42	55.92	....
Rochester, del.	49.22	49.22	49.72	50.22
Syracuse, del.	50.025	50.025	50.525	41.025
Chicago, furnace	46.00	43.00-46.50	43.50-46.50	47.00
Milwaukee, del.	47.72	44.72-48.22	45.22-48.22	48.72
Muskegon, Mich., del.	....	47.98-51.48	48.48-51.48	....
Cleveland, furnace	46.00	46.50	46.50	47.00
Akron, del.	48.17	48.67	48.67	49.17
Lone Star, Tex., furnace	....	†75.00	....	....
Duluth, furnace	....	46.00	46.50	47.00
Erie, Pa., furnace	45.50	46.00	46.50	47.00
Everett, Mass., furnace	....	48.75	49.25	....
Geneva, Utah, furnace	46.00	46.50	....	....
Seattle, Tacoma, Wash., del.	....	53.63	....	....
Portland, Oreg., del.	....	53.63	....	....
Los Angeles, San Francisco.	53.13	53.63	....	....
Granite City, Ill., furnace	47.90	48.40	48.90	....
St. Louis, del.	48.65	49.15	49.65	....
Ironton, Utah, furnace	....	46.50	....	....
‡Neville Island, Pa., furnace	46.00	46.50	46.50	47.00
Pittsburgh, del., N.&S. Sides	47.08	47.58	47.58	48.08
Pittsburgh (Carnegie), furnaces	46.00	46.50	46.50	47.00
Sharpsville, Pa., furnace	46.00	46.50	46.50	47.00
Steelton, Pa., furnace	48.00	48.50	49.00	49.50
Struthers, O., furnace	42.50	....	....	....
Swedeland, Pa., furnace	50.00	50.50	51.00	....
Toledo, O., furnace	45.50	46.00	46.50	47.00
Cincinnati, del.	50.05	50.55	....	....
Youngstown, O., furnace	46.00	46.50	46.50	47.00
Mansfield, O., del.	49.87	50.37	50.37	50.87

* Republic Steel Corp. quotes $1 a ton higher for basic, No. 2 foundry and malleable at Buffalo.

† Low phosphorus southern grade.

‡ To Neville Island base add: $0.86 for McKees Rocks, Pa.; $1.31 Lawrenceville, Homestead, McKeesport, Monaco; $1.73 Verona; $1.94 Brackenridge; $1.08 for Ambridge and Aliquippa.

Blast Furnace Silvery Pig Iron

6.00-6.50 per cent Si (base).$59.50
6.51-7.00.. 60.75 9.01- 9.50. 67.00
7.01-7.50.. 62.00 9.51-10.00. 68.25
7.51-8.00.. 63.25 10.01-10.50. 69.50
8.01-8.50.. 64.50 10.51-11.00. 70.75
8.51-9.00.. 65.75 11.01-11.50. 72.00

Fob Jackson, O., per gross ton. Buffalo furnace $1.25 higher.

Bessemer Ferrosilicon

Prices same as for blast furnace silvery iron, plus $1 per gross ton.

Electric Furnace Silvery Pig Iron Si 14.01-14.50%, $81.75 furnace, Niagara Falls; $81 open-hearth and $82 foundry grade, Keokuk, Iowa. Add $1 a ton for each additional 0.5% Si to 18%; 50c for each 0.5% Mn over 1%; $1 a ton for 0.045% max. phos.

Charcoal Pig Iron

Semi-cold blast, low phosphorus. Fob furnace, Lyles, Tenn. .....$62 (For higher silicon iron a differential over and above the price of base grade is charged as well as for the hard chilling iron, Nos. 5 and 6.)

Low Phosphorus

Steelton, Pa., $54; Buffalo, Troy, N. Y., $50. Philadelphia, $56.81 delivered.

Intermediate phosphorus, Central furnace, Cleveland, $51.

Differentials

Prices are subject to following differentials:

Silicon: An additional charge of 50 cents a ton for each 0.25 per cent silicon in excess of base grade (1.75% to 2.25%).

Phosphorus: A reduction of 38 cents a ton for phosphorus content of 0.70 per cent and over.

Manganese: An additional charge of 50 cents a ton for each 0.50 per cent, or portion thereof, manganese in excess of 1%.

Nickel: An additional charge for nickel content as follows: Under 0.50%, no extra; 0.50% to 0.74%, inclusive, $2 a ton; for each additional 0.25% nickel, $1 a ton.

Fluorspar

Metallurgical grade, fob shipping point, in Ill., Ky., net tons, carloads, effective CaF_2 content, 70% or more $37; less than 60% $34.

Metallurgical Coke

Price per Net Ton

Beehive Ovens

Connellsville, furnace	$13.50-15.50
Connellsville, foundry	16.00-18.00
New River, foundry	16.50
Wise county, foundry	15.35
Wise county, furnace	14.60

Oven Foundry Coke

Kearney, N. J., ovens	$21.50
Chicago, ovens	20.40
Terre Haute, ovens	21.00
Milwaukee, ovens	21.15
New England, del.	22.75
Birmingham, del.	18.66
Indianapolis, ovens	20.85
Cincinnati, del.	21.40
Ironton, O., ovens	18.25
Erie, Pa., del.	22.45
Painesville, O., ovens	20.90
Cleveland, del.	22.45
Buffalo, del.	23.10
Detroit, del.	21.65
Philadelphia, ovens	20.55
Swedeland, Pa., ovens	20.50
Portsmouth, O., ovens	19.25

Coal Chemicals

Spot, cents per gallon, ovens
(Price effective as of Aug. 5)

Pure benzol	20.00
Toluol, one degree	20.50-26.50
Toluol, two degrees	23.00-26.50
Industrial xylol	20.50-26.50

Per pound, ovens

Phenol, 40 (car lots, returnable drums)	13.00
Do., less than carlots	13.75
Do., tank cars	12.00
Naphthalene flakes, balls, bbl to jobbers, "household use"	12.00

Per ton, bulk, ovens

Sulphate of ammonia	$45.00

Refractories

(Prices per 1000 brick, fob plant)

Fire Clay Brick

Super Duty: St. Louis Vandalia, or Farber, Mo., Olive Hill, Ky., Clearfield, or Curwensville, Pa., $100.

High-Heat Duty: Salina, Pa., $85; Woodbridge, N. J., St. Louis, Farber, or Vandalia, Mo., West Decatur, Orviston, Clearfield, Beach Creek, or Curwensville, Pa., Olive Hill, Hitchins, Haldeman, or Ashland, Ky., Troup, or Athens, Tex., Stevens Pottery, Ga., Portsmouth, or Oak Hill, O., $80.

Intermediate-Heat Duty: St. Louis, or Vandalia, Mo., West Decatur, Orviston, Beach Creek, or Clearfield, Pa., Olive Hill, Hitchins, Haldeman, or Athens, Ky., Troup, Tex., Stevens Pottery, Ga., or Portsmouth, O., $74.

Low-Heat Duty: Oak Hill, or Portsmouth, O., Clearfield, Pa., Bessemer, Ala., $66.

Ladle Brick

Dry Press: $55, Freeport, Merill Station, Clearfield, Pa.; Chester, New Cumberland, W. Va.; Irondale, Wellsville, O.

Wire Cut: $53, Chester, New Cumberland, W. Va.; Wellsville, O.

Malleable Bung Brick

St. Louis, Mo., Olive Hill, Ky., $83; Beach Creek, Pa., $73.

Silica Brick

Mt. Union, Claysburg, or Sproul, Pa., Ensley, Ala., $80; Hays, Pa. $85; Joliet or Rockdale, Ill., $89; Lehi, Utah, Los Angeles, $95.

Eastern Silica Coke Oven Shapes: Claysburg, Mt. Union, Sproul, Pa., $80.

Illinois Silica Coke Oven Shapes: Joliet or Rockdale, Ill., $81.

Basic Brick

(Base prices per net ton; f.o.b. works, Baltimore or Chester, Pa.) Chrome brick or chemical-bonded chrome brick, $69, magnesite brick, $91; chemical-bonded magnesite, $80.

Magnesite

(Base prices per net ton, fob works, Chewelah, Wash.)
Domestic dead-burned, ⅜" grains: Bulk, $31; single paper bags, $35.50.

Dolomite

(Base prices per net ton)
Domestic, dead-burned bulk: Billmeyer, Blue Bell, Williams, Plymouth Meeting, Pa., Millville, W. Va., Nario, Millersville, Martin, Gibonsburg, Woodville, O., $11.85; Thornton, McCook, Ill., $11.95; Dolly Siding, Bonne Terre, Mo., $12.05.

Ores

Lake Superior Iron Ore

Gross ton, 51½% (natural) Lower Lake Ports

(Any increase or decrease in R. R. freight rates, dock handling charges and taxes thereon effective after Apr. 1, 1948, are for buyer's account.)

Old range bessemer	$6.60
Old range nonbessemer	6.45
Mesabi bessemer	6.35
Mesabi nonbessemer	6.20
High phosphorus	6.20

Eastern Local Ore

Cents, units, del. E. Pa.

Foundry and basic 56.62% contract	15.25

Foreign Ore

Cents per unit, cif Atlantic ports

Swedish basic, 60 to 68%	14.50
Brazil iron ore, 68-69%	18.50

Tungsten Ore

Wolframite and scheelite per short ton unit, duty paid	$26-$28

Manganese Ore

48-50%, duty paid, fob cars, New York, Philadelphia, Baltimore, Norfolk, Va., Mobile, Ala., New Orleans, 67.60c-72.60c.

Chrome Ore

Gross ton fob cars, New York, Philadelphia, Baltimore, Charleston, S.C., plus ocean freight differential for delivery to Portland, Oreg., and/or Tacoma, Wash. (S S paying for discharge; dry basis, subject to penalties if guarantees are not met.)

Indian and African	
48% 2.8:1	$37.50
48% 3:1	39.00
48% no ratio	31.00
South African (Transvaal)	
44% no ratio	$25.50-$26.00
45% no ratio	26.50
48% no ratio	29.00-30.00
50% no ratio	29.50-30.50
Brazilian—nominal	
44% to 2.5:1 lump	$33.65
Rhodesian	
45% no ratio	$27-$27.50
48% no ratio	30.00
48% 3:1 lump	39.00
Domestic (seller's nearest rail)	
48% 3:1	$39.00

Molybdenum

Sulphide conc., lb., Mo., cont., Mines	$0.75

WAREHOUSE STEEL PRICES

Prices, cents per pound, for delivery within switching limits, subject to extras.

	SHEETS			STRIP		BARS				PLATES	
	H-R 10 Ga.	C-R 17 Ga.	Gal. *10 Ga.	†H-R	†C-R	H-R Rds. ⅝" to 3"	C-F Rds. ½" & up	H-R Alloy **4140	Standard Structural Shapes	Carbon ⅜"–¾"	Floor ⅜" & Thicker
Boston (city)..	5.84	6.64	7.84	6.04	6.90	5.69	6.39	8.24-9.74	5.54	5.89	7.34
Boston (c'try).	5.69	6.49	7.69	5.89	6.75	5.54	6.24	8.09-9.59	5.39	5.74	7.19
New York (city)	5.73-5.80	6.73	7.74-7.83	6.08-6.28	...	5.83	6.58	8.22	5.52-5.78	5.98	7.48
New York (c'try)	5.53-5.60	6.53	7.54-7.63	5.88-6.08	...	5.63	6.38	...	5.32-5.58	5.78	7.28
Phila. (city) ..	5.50-5.86	6.61-6.81	7.42-7.62	5.46-5.81	...	5.57-5.65	6.31	7.94	5.24-5.40	5.52-5.65	6.73-7.16
Phila. (c'try) ..	5.35-5.71	6.46-6.66	7.27-7.47	5.31-5.66	...	5.42-5.50	6.16	7.79	5.09-5.25	5.37-5.50	6.58-7.01
Balt. (city) ...	5.43†	6.33	7.13	5.49	...	5.54	...	...	5.48	5.68	7.13
Balt. (c'try)...	5.28†	6.18	6.98	5.34	...	5.39	...	...	5.33	5.53	6.98
Norfolk, Va. ..	5.75	...	...	...	...	6.00	7.00	...	6.00	6.00	7.50
Wash. (w'house)	5.81-5.97	...	...	5.87	...	5.88-5.92	6.58	...	5.82-5.86	6.02-6.06	7.47-7.51
Buffalo (del.)..	5.20-5.25	5.95-6.00	7.75	5.70	6.50	5.35	6.05	9.50	5.25	5.60	7.70
Buff. (w'house)	5.05-5.10	5.80-5.85	7.60	5.55	6.35	5.20	5.90	9.40	5.10	5.45	7.55
Pitts. (w'house)	4.85-5.00‖	5.75-5.85[3]	7.00-7.05	5.00-5.35	5.95-6.00	4.90-5.10	5.65	7.65	4.90-5.15	5.05-5.25	6.55
Det. (w'house).	5.40-5.75‖	6.30-6.60	7.60	5.40-5.70	6.50	5.45	6.17	8.12	5.45	5.65-5.80	7.10
Cleveland (del.)	5.13-5.29	6.00-6.29	7.34-7.49	5.17-5.69	6.85	5.30-5.34	6.05-6.10	7.94-8.29	5.34-5.60	5.50-5.54	6.95-6.99
Cleve. (w'hse).	4.98-5.75	5.75-6.14	7.19-7.85	5.02-5.54	6.70	5.15-5.19	5.90-5.95	7.79-8.14	5.19-5.45	5.35-5.39	6.80-6.84
Cincin. (w'hse)	5.26	6.11	7.60	5.52	6.07	5.52	6.07	...	5.37	5.61	6.91
Chicago (city).	5.20	5.90‡[3]	7.20	5.00	6.30	5.05	5.85	7.80[9]	5.05	5.25	6.70
Chicago (w'hse)	5.05	5.75‡[3]	7.05	4.85	6.15	4.90	5.70	7.65[9]	4.90	5.10	6.55
Milwaukee (city)	5.37	6.07‡[3]	7.37	5.17	6.47	5.22	6.02	7.97[9]	5.22	5.42	6.87
St. Louis (del.)	5.34‖	6.24[3]	7.44	5.34	6.64	5.39	6.19[12]	6.64	5.39	5.59	7.04
St. L. (w'hse).	5.19‖	6.09[3]	7.29	5.19	6.49	5.24	6.04[12]	9.49	5.24	5.44	6.89
Birm'ham (city)	5.20‖	...	6.60	5.20	...	5.15	6.66	...	5.15	5.40	7.41-7.66
Birm'ham(c'try)	5.05‖	...	6.45	5.05	...	5.00	6.51	...	5.00	5.25	7.26-7.51
Omaha, Nebr...	6.07	...	9.33	6.07	...	6.12	6.92	...	6.12	6.32	7.77
Los Ang. (city)	6.55‖	8.05	8.20†	6.75	9.50	6.20	8.00-8.50	...	6.70	6.40	8.15
Los Angeles (w'house) ...	6.40‖	7.90	8.05†	6.60	9.35	6.05	7.85-8.35	...	6.55	6.25	8.00
San Francisco..	5.95[21]	7.15	8.05	6.75[21]	8.25[18]	5.90[21]	7.55	10.20‡‡	5.90	7.60	8.10
Seattle-Tacoma .	6.35[17]	7.90[3]	8.40	6.70[17]	...	6.20[17]	8.15[1]	9.45[2]	6.30[17]	6.35[17]	8.40[17]

Base Quantities: 400 to 1999 lb except as noted: Cold-rolled strip, 2000 lb and over; cold finished bars, 1000 lb and over; galvanized sheets, 450 to 1499 lb; [1]—1500 lb and over; [2]—1000 to 4999 lb; [3]—450 to 39,999 lb; [4]—three to 24 bundles; [5]—450 to 1499 lb; [6]—400 to 14,999 lb; [8]—400 to 1499 lb; [9]—1000 to 1999 lb; [11]—1000 to 39,999 lb; [12]—1000 lb and over; [18]—2000 lb and over; [17]—300 to 999 lb; [18]—1500 to 1999 lb; [19]—1500 to 39,999 lb; [20]—400 to 3999 lb; [21]—400 lb and over; [22]—500 to 1499 lb; [23]—Price (but not other price in range) applies to any and all quantities.

* Includes gage and coating extra, except Birmingham (coating extra excluded); † does not include gage extras; ‡ 15 gage; ‖ 18 gage and heavier; ** as rolled; †† add 0.40 for sizes not rolled in Birmingham.

PRICES OF LEADING FERROALLOYS PRODUCTS

MANGANESE ALLOYS

Spiegeleisen: (19-21% Mn, 1-3% Si) Carlot per gross ton, $57, Palmerton, Pa.; $66, Pittsburgh and Chicago; (16% to 19% Mn.) $1 per ton lower.

Standard Ferromanganese: (Mn 78-82%, C 7% approx.). Carload, lump, bulk $160 per gross ton of alloy, c.l., packed, $172; gross ton lots, packed, $187; less gross ton lots, packed, $204; fob Alloy, W. Va., Niagara Falls, N. Y.; or Welland, Ont. Base price; $165, Rockwood, Tenn.; $162, f.o.b. Birmingham and Johnstown, Pa., furnaces; $160, Sheridan, Pa.; $163, Aetna, Pa. Shipment from Pacific Coast warehouses on one seller add $31 to above prices, fob Los Angeles, San Francisco, Portland, Oreg. Shipment from Chicago warehouse, ton lots, $201; less gross ton lots, $218 fob Chicago. Add or subtract $2 for each 1%, or fraction thereof, of contained manganese over 82% and under 78%.

Low-Carbon Ferromanganese, Regular Grade: (Mn 80-85%). Carload, lump, bulk, max. 0.10% C, 24.75c per lb of contained Mn, carload packed 26.0c, ton lot 27.1c, less ton 28.3c. Delivered. Deduct 0.5c for max. 0.15% C grade from above prices, 1c for max. 0.30% C, 1.5c for max. 0.50% C, and 4.5c for max. 0.75% C—max 7% Si. **Special Grade:** (Mn 90% approx., C 0.07% max., P 0.06% max.). Add 0.5c to above prices. Spot, add 0.25c.

Medium-Carbon Ferromanganese: (Mn 80-85%, C 1.5% max., Si 1.5% max.). Carload, lump, bulk 18.15c per lb of contained Mn, carload packed 18.9c, ton lot 20.0c, less ton 21.2c. Delivered. Spot, add 0.25c.

Manganese Metal: (Mn 96% min., Fe 2% max., Si 1% max., C 0.20% max.). Carload, 2" x D, packed 35.5c per lb of metal, ton lot 37c, less ton 39c. Delivered. Spot, add 2c.

Silicomanganese: (Mn 65-68%). Contract, lump, bulk, 1.50% C grade, 18-20% Si, 8.6c per lb of alloy, carload packed, 9.35c, ton lot 10.25c, less ton 11.25c. Freight allowed. For 2% C grade, Si 15-17.5%, deduct 0.2c from above prices. Spot, add 0.25c.

CHROMIUM ALLOYS

High-Carbon Ferrochrome: Contract, c.l., lump, bulk 20.5c per lb of contained Cr, c.l., packed 21.4c, ton lot 22.55c, less ton 23.95c. Delivered. Spot, add 0.25c.

"SM" High-Carbon Ferrochrome: (Cr 60-65%, Si 4-6%, Mn 4-6%, C 4-6%). Add 1.1c to high-carbon ferrochrome prices.

Foundry Ferrochrome: (Cr 62-66%, C 5-7%). Contract, c.l., SMxD, bulk 22.0c per lb. of contained Cr, c.l., packed 22.9c, ton lot 24.25c, less ton 26.0c. Delivered. Spot, add 0.25c.

Low-Carbon Ferrochrome: (Cr 67-72%). Contract, carload, lump, bulk, max. 0.03% C 31.85c per lb of contained Cr, 0.04% C 29.75c, 0.05% C 29.25c, 0.06% C 28.75c, 0.10% C 28.25c-28.5c, 0.15% C 28.0c, 0.20% C 27.75c, 0.50% C 27.5c, 1% C 27.25c, 2% C 27.0c. Carload packed add 1.1c, ton lot add 2.2c, less ton add 3.9c. Delivered. Spot, add 0.25c.

"SM" Low-Carbon Ferrochrome: (Cr 62-66%, Si 4-6%, Mn 4-6%, add C 1.25% max.). Contract, carload, lump, bulk 27.75c per lb of contained chromium, carload, packed 28.85c, ton lot 30.05c, less ton 31.85c. Delivered. Spot, add 0.25c.

Low-Carbon Ferrochrome, Nitrogen Bearing: Add 5c to 0.10% C low-carbon ferrochrome prices for approx. 0.75% N. Add 5c for each 0.25% of N above 0.75%.

Chromium Metal: (Min 97% Cr and 1% Fe). Contract, carload, 1" x D; packed, max. 0.50% C grade, $1.03 per lb of contained chromium, ton lot $1.05, less ton $1.07. Delivered. Spot, add 5c.

SILICON ALLOYS

20-30% Ferrosilicon: Contract, carload, lump, bulk, 16.50-17.50c per lb of contained Si; packed 18.90c; ton lots 20.00c, fob Niagara Falls, N. Y., freight not exceeding St. Louis rate allowed.

50% Ferrosilicon: Contract, carload, lump, bulk, 10.5c per lb of contained Si, carload packed 12.1c, ton lot 13.55c, less ton 15.2e. Delivered. Spot, add 0.45c.

Low-Aluminum 50% Ferrosilicon: (Al 0.40% max.) Add 1.3c to 50% ferrosilicon prices.

75% Ferrosilicon: Contract, carload, lump, bulk, 13.0c per lb of contained Si, carload packed 14.3c, ton lot 15.45c, less ton 16.7e. Delivered. Spot, add 0.3c.

80-90% Ferrosilicon: Contract, carload, lump, bulk 14.65-15c per lb of contained Si, carload packed 15.9c, ton lot 16.9c, less ton 18.05c. Delivered. Spot, add 0.25c.

Low-Aluminum 85% Ferrosilicon: (Al 0.50% max.). Add 0.7c to 85% ferrosilicon prices.

90-95% Ferrosilicon: Contract, carload, lump, bulk, 16.5c per lb of contained Si, carload packed 17.7c, ton lot 18.65c, less ton 19.7e. Delivered. Spot, add 0.25c.

Low-Aluminum 90-95% Ferrosilicon: (Al 0.50% max.) Add 0.7c to above 90-95% ferrosilicon prices.

Silicon Metal: (Min. 97% Si and 1% max. Fe.). C.l., lump, bulk, regular 19.0c per lb of Si c.l. packed 20.2c, ton lot 21.1c, less ton 22.1c. Add 1.5c for max. 0.10% calcium grade. Deduct 0.4c for max. 2% Fe grade analyzing min. 96% Si. Spot, add 0.25c.

Alsifer: (Approx. 20% Al, 40% Si, 40% Fe). Contract, basis fob Niagara Falls, N. Y., lump per lb cl 6.90c; ton lots packed, 7.40c; 200 to 1999 lb, 8.15c, smaller lots 8.65c; or, lump, carload, bulk, 8.40c per lb of alloy, packed c.l. 9.20c, ton lots 9.30c, 200 to 1000 lb 9.65c, less 200 lb 10.15c per lb of alloy. Delivered. Spot up 0.5c.

BRIQUETTED ALLOYS

Chromium Briquets: (Weighing approx. 3½ lb each and containing exactly 2 lb of Cr). Contract, carload, bulk, 13.75c per lb of briquet, carload packed 14.45c, ton lot 15.25c, less ton 16.15c. Delivered. Add 0.25e for notching. Spot, add 0.25c.

(Please turn to Page 140)

Domestic Zinc Prices Advance

Prime western advances to range of 15.00c to 15.50c, East St. Louis. Lead price tone strengthens. Prolonged strikes in major producing area aggravate supply shortage

New York — Shortages of major nonferrous metals, coupled with prospects of heavier withdrawals by the government for stockpiling purposes, are exerting pressure on price structures of the affected markets.

Zinc — Sales of prime western zinc were made last week at 15.50c a pound, East St. Louis, by at least one leading seller. This represented an advance of 1/2-cent a pound over the 15-cent quotation that had prevailed generally since July 28 when it was raised 3 cents a pound from the 12-cent level. The 12-cent price had held since Jan. 21 on which date it had been raised 2.50 cents a pound.

Up to late last week, other producers had not followed the increase although some withdrew temporarily from the market. Since Oct. 19, therefore, the market has been quotable at 15.00c to 15.50c, East St. Louis. In the Tri-State district important producing interests maintained their price at 15.00c a pound.

Along with other nonferrous metals, the zinc supply situation has been tight for some time past. Premium prices in excess of the domestic quotation have been reported paid for metal of foreign origin by domestic consumers. On top of the heavy demand for zinc from galvanizers, die casters, and other zinc users, the tight supply situation has been aggravated by prolonged strikes last summer in the important zinc producing Tri-State district. Currently, strikes have closed one slab zinc plant and two zinc oxide plants of the American Zinc, Lead & Smelting Co.

Sellers of slab zinc on export account are complaining of the fact that the Office of International Trade has not released export licenses for the fourth quarter. It was pointed out in the trade that when export licenses are not released promptly at the beginning of the quarterly period, shipping schedules are seriously disrupted.

Lead — While the domestic market held unchanged last week on the basis of 19.30c to 19.35c, St. Louis, for the common lead grade, the export market strengthened. Producers of Mexican lead have advanced their export price to non-United States consumers to the basis of 20.00c a pound, f.a.s. Gulf ports. This represents an advance of 3/4-cent above the price which was established on July 28 when the domestic market here rose 2 cents a pound to present levels. Suppliers of Mexican lead continued to quote last week on domestic business on the basis of 19.50c, delivered New York.

Antimonial lead, which has been selling at a premium of $35 a ton, is showing a further hardening tendency. Some suppliers are now asking a premium of $50 a ton and others claim the premium should be $65 a ton on the basis of current costs of battery plates. At least one large eastern buyer of battery plates has eliminated his smelting charge of $10 a ton in the hope of attracting supplies which have been going to buyers in the midwestern area. The latter buyers, it is claimed, have been paying the freight from point of origination to their smelteries, as well as waiving smelting charges. Secondary refined lead is in scarce supply for early delivery and the last sales reported were at a range of 24.00c to 25.00c per pound.

Moderate tonnages of lead for October shipment from Burma are being offered for sale at 24.00c, c.i.f. New York.

All mining, milling and smelting operations of the Missouri division of St. Joseph Lead Co., closed by a strike since July 7, were resumed last week.

Copper — Some of the leading suppliers of copper opened their November books last week, but accepted orders cautiously due to uncertainty regarding the tonnages that may be withdrawn from the market by the government for stockpiling. Prices held unchanged on the basis of 23.50c, Connecticut Valley, for electrolytic.

Deliveries of copper to domestic consumers in September increased about 16,000 tons to a total of 123,188 tons, representing the heaviest movement since March, 1947, according to figures released by the Copper Institute. Refined copper production held steady at 102,976 tons, while crude copper production from both primary and secondary sources amounted to 88,071 tons, compared with 89,165 tons in August.

Stocks of refined copper declined 7364 tons to a total of 72,215 tons as of Sept. 30.

Tin — Stocks of pig tin held by the Office of Metals Reserve and available for sale amounted to 41,575 tons as of Sept. 30. This represents an increase of 1664 tons for the month, 17,020 tons since the beginning of the year, and about 30,000 tons since mid-summer of 1947.

The third meeting of the International Tin Group is scheduled to start at the Hague, Holland, Oct. 25. The first meeting was held in April, 1947, at Brussels; the second, last April, at Washington.

Remelt Aluminum — Smelters of secondary aluminum alloys have advanced their prices on an average of about 1/2-cent a pound, but there is still no uniformity and the range between the prices named by the various producers is 1-cent a pound on most of the alloys. The advance in prices was attributed to scarcity of scrap.

Harvey Machne Co., Los Angeles, has purchased a surplus, government-owned aluminum extrusion plant in that city for $1,500,000. The company has been operating the property since April, 1946, under a five-year lease. It has informed the War Assets Administration that it plans to increase the output by the addition of other types of manufacture and new developments.

Stockpiling Plans Studied

Washington — Zinc and cadmium producers and importers who met with Commerce and Munitions Board officials Oct. 20 declared their desire to co-operate in the stockpiling program but decided that the best procedure is for the Bureau of Federal Supply conduct procurement negotiations with the individual companies. This would cut out the red tape required to set up an allocations agreement under Public Law 395.

Lead and bismuth producers and importers, after a thorough discussion of the supply-demand situation in these metals, decided Oct. 19 that additional information will be necessary before a voluntary allocations program could be discussed effectively. Accordingly, the group decided to reconvene for further discussion Nov. 10 to determine what can be done to build up the stockpile of these metals.

Opens New Nonferrous Foundry

New York—National Bearing Division, American Brake Shoe Co., has announced the opening of its new nonferrous foundry in Meadville, Pa. —newest of the concern's six postwar plants. Operations have been discontinued at former plants in Jersey City, N. J., the old plant in Meadville, and two other plants in Pittsburgh.

When in full production the new addition will greatly exceed the combined productive capacities of the four old plants, according to officials. It also will offer complete machining facilities which were not available in any of the former plants.

Aluminum Plant Altered

Vancouver B. C.—C. S. Thayer, works manager for Aluminum Co. of America, announces that $1 million is being spent in fume control at the local plant where hoods are being installed over the pots to collect fluorides and a system of fans placed. A washing system installed in 1944 proved ineffective. Installation contract is held by H. L. Hoffman, Portland, Oreg., and the Santa Fe Tank & Tower Co., Los Angeles, will erect the towers.

Tin Controls To Be Extended

Washington — Commerce Department has disclosed it expects to keep restrictions on the use of tin in effect through next June 30 (despite expected increases in world supplies of tin). The restrictions limit the amount of tin that can be used in beer cans and coffe cans among other things. The department said its decision to retain restriction measures through the first half of next year was based on the "critical need for metal in the nation's strategic stockpile."

NONFERROUS METAL PRICES

(Cents per pound, carlots, except as otherwise noted)

Copper: Electrolytic, 23.50c, Conn. Valley; Lake, 23.62½c, Conn. Valley.

Brass Ingot: 85-5-5-5 (No. 115) 20.50-22.00c; 88-10-2 (No. 215) 31.00c; 80-10-10 (No. 305) 27.25c; No. 1 yellow (No. 405) 17.00-17.50c.

Zinc: Prime western 15.00-15.50c, brass special 15.25-15.75c, intermediate 15.50-16.00c, East St. Louis; high grade 16.00-16.50c, delivered.

Lead: Common 19.30-19.35c, chemical and corroding 19.40c, St. Louis.

Primary Aluminum: 99% plus, ingots 17.00c, pigs 16.00c. Base prices for 10,000 lb and over, fob shipping point, freight allowed.

Secondary Aluminum: Piston alloy (No. 122 type 23.50-24.00c; No. 12 foundry alloy (No. 2 grade) 23.00-23.50c; steel deoxidizing grades, notch bars, granulated or shot: Grade 1, 24.50-25.50c; grade 2, 23.75-24.50c; grade 3, 22.75-23.50c; grade 4, 22.25-23.00c. Prices include freight at carload rate up to 75 cents per 100 lb.

Magnesium: Commercially pure (99.8%) standard ingots, 10,000 lb and over, 20.50c, fob Freeport, Tex.

Tin: Grade A, 99.8% or higher (including Straits) $1.03; grade B, 99.8% or higher, not meeting specifications for grade A, with 0.05% max. arsenic, $1.028; grade C, 99.65-99.79%, incl., $1.024; 99.5-99.649% $1.024, grade F, 98-98.999% $1.015 for tin content. Prices are ex-dock, New York, in 5-ton lots.

Antimony: American 99-99.8% and over but not meeting specifications below, 38.50c; 99.8% and over (arsenic 0.05% max.; other impurities, 0.1% max.) 39.00c, fob Laredo, Tex., for bulk shipments.

Nickel: Electrolytic cathodes, 99.9%, base sizes at refinery, unpacked, 40.00c; 25-lb pigs, 42.50c; shot nom.; "XX" nickel shot, 43.50c; "F" nickel shot or ingots, for addition to cast iron, 40.50c. Prices include import duty.

Mercury: Open market, spot, New York $76-$78 per 76-lb flask.

Beryllium-Copper: 3.75-4.25% Be, $24.50 per lb contained Be.

Cadmium: "Regular" straight or flat forms, $1.90, del.; special or patented shapes, $2.

Cobalt: 97-98%, $1.65 per lb for 550 lb (keg); $1.67 per lb for 100 lb (case); $1.72 per lb under 100 lb.

Gold: U. S. Treasury, $35 per ounce.

Silver: Open market, New York, 77.50c per ounce.

Platinum: $93-$96 per ounce.

Palladium: $24 per troy ounce.

Iridium: $110-$115 per troy ounce.

Titanium (sponge form): $5 per pound.

Rolled, Drawn, Extruded Products

COPPER AND BRASS

(Base prices, cents per pound, fob mill)

Sheet: Copper 37.18; yellow brass 33.75; commercial bronze, 95%, 37.11; 90%, 36.63; red brass, 85%, 35.64; 80%, 35.16; best quality, 34.63; nickel silver, 18%, 46.41; phosphor-bronze, grade A, 5%, 56.05.

Rods: Copper, hot rolled 33.03; cold drawn 34.28; yellow brass, free cutting, 33.44; commercial bronze, 95% 36.80; 90% 36.32; red brass, 85% 35.33; 80% 34.85.

Seamless Tubing: Copper 37.22; yellow brass 36.76; commercial bronze 90% 39.29; red brass 85% 38.55; 80% 38.07.

Wire: Yellow brass 34.04; commercial bronze, 95% 37.40; 90% 36.92; red brass, 85% 35.93, 80% 35.45; best quality brass 34.92.

Copper Wire: Bare, soft, fob eastern mills, c.l. 29.42½c, l.c.l. 29.92½-30.05c; weatherproof, fob eastern mills, c.l. 29.60-29.85c, l.c.l. 30.35c; magnet, delivered, c.l. 32.75-33.50c, 15,000 lb or more 33.00-33.75c, l.c.l. 33.50-34.25c.

ALUMINUM

Sheets and Circles: 2S and 3S mill finish c.l. (Two producers quote 1-cent per pound lower.)

Thickness Range, Inches	Widths or Diameters, In., Incl.	Flat Sheet Base*	Coiled Sheet Base	Coiled Sheet Circle† Base
0.249-0.136	12-48	26.9	...	...
0.135-0.096	12-48	27.4	...	...
0.095-0.077	12-48	27.9	26.0	29.6
0.076-0.068	12-48	28.5	26.2	29.8
0.067-0.061	12-48	28.5	26.2	29.8
0.060-0.048	12-48	28.7	26.4	30.1
0.047-0.038	12-48	29.1	26.6	30.4
0.037-0.030	12-48	29.5	27.0	30.9
0.029-0.024	12-48	29.9	27.3	31.3
0.023-0.019	12-36	30.5	27.7	31.8
0.018-0.017	12-36	31.1	28.3	32.6
0.016-0.015	12-36	31.8	28.9	33.5
0.014	12-24	32.7	29.7	34.6
0.013-0.012	12-24	33.6	30.4	35.5
0.011	12-24	34.6	31.3	36.7
0.010-0.0095	12-24	35.6	32.3	38.0
0.009-0.0085	12-20	36.8	33.4	39.5
0.008-0.0075	12-20	38.1	34.6	41.1
0.007	12-18	39.5	35.9	42.9
0.006	12-18	41.0	37.2	47.0

* Minimum length, 60 inches. † Maximum diameter, 24 inches.

Screw Machine Stock: 5000 lb and over.

Diam. (in.) or distance across flats	—Round— R317-T4, 17S-T4	—Hexagonal— R317-T4	—Hexagonal— 17S-T4
0.125	48.0	...	...
0.156-0.203	41.0	...	...
0.219-0.313	38.0	...	...
0.344	37.0	...	47.0
0.375	36.5	45.5	44.0
0.406	36.5	...	...
0.438	36.5	45.5	44.0
0.469	36.5	...	...
0.500	36.5	45.5	44.0
0.531	36.5	...	...
0.563	36.5	...	41.5
0.594	36.5	...	...
0.625	36.5	43.0	41.5
0.656	36.5	...	...
0.688	36.5	...	41.5
0.750-1.000	35.5	40.5	39.0
1.063	35.5	...	37.5
1.125-1.500	34.5	39.0	37.5
1.563	34.5	...	37.5
1.625	33.5	...	36.5
1.688-2.000	33.5	...	...
2.125-2.500	32.5	...	...
2.625-3.375	31.5	...	...

LEAD

(Prices to jobbers, fob Cleveland, Pittsburgh)

Sheets: Full rolls, 140 sq ft or more, $23.25 per cwt.; add 50c per cwt., 10 sq ft to 140 sq ft; $1.25, less than 10 sq ft; $1, circles and segments. **Pipe:** Full coils, $22.50 per cwt; cut coils, $22.75. **Traps and Bends:** List price plus 70%.

ZINC

Sheets, 19.50-20.00c, fob mill, 36.00 lb and over. Ribbon zinc in coils, 18.25c-19.00c, fob mill, 36,000 lb and over. Plates, not over 12-in., 17.25c; over 12-in., 18.25c.

NICKEL

(Base prices, fob mill.)

Sheets, cold-rolled, 60.00c. Strip, cold-rolled 66.00c. Rods and shapes, 56.00c. Plates 58.00c. Seamless tubes, 89.00c.

MONEL

(Base prices, fob mill.)

Sheets, cold-rolled 47.00c; Strip, cold-rolled, 50.00c. Rods and shapes, 45.00c. Plates, 46.00c. Seamless tubes, 80.00c. Shot and blocks, 40.00c.

MAGNESIUM

Extruded Rounds, 12 in. long, 1.312 in. in diameter, less than 25 lb, 52.00-56.00c; 25 to 99 lb, 42.00-46.00c; 100 lb to 4000 lb., 35.00-36.00c.

DAILY PRICE RECORD

	Copper	Lead	Zinc	Tin	Aluminum	Antimony	Nickel	Silver
Sept. Avg.	23.50	19.325	15.00	103.00	16.50	35.00	40.00	75.284
Oct. 1	23.50	19.30–19.35	15.00	103.00	16.00–17.00	35.00	40.00	76.50
Oct. 4	23.50	19.30–19.35	15.00	103.00	16.00–17.00	35.00	40.00	77.00
Oct. 5	23.50	19.30–19.35	15.00	103.00	16.00–17.00	35.00	40.00	77.25
Oct. 6-9	23.50	19.30–19.35	15.00	103.00	16.00–17.00	35.00	40.00	77.50
Oct. 11-18	23.50	19.30–19.35	15.00	103.00	17.00	38.50	40.00	77.50
Oct. 19-21	23.50	19.30–19.35	15.00–15.50	103.00	17.00	38.50	40.00	77.50

NOTE: Copper: Electrolytic, del. Conn. Valley; Lead, common grade, del. E. St. Louis; Zinc, prime western, del. St. Louis; Tin, Straits, del. New York; Aluminum, primary ingots, 99%, del.; Antimony, bulk, fob Laredo, Tex.; Nickel, electrolytic cathodes, 99.9%, base sizes at refinery, unpacked; Silver, open market, New York. Prices, cents per pound; except silver, cents per ounce.

Plating Materials

Chromic Acid: 99.9%, flake, fob Philadelphia, carloads, 26.00c; 5 tons and over 26.50c; 1 to 5 tons, 27.00c; less than 1 ton, 27.50c.

Copper Anodes: Base, 2000 to 5000 lb; fob shipping point, freight allowed: Flat untrimmed, 33.84c; oval 33.34c; electrodeposited, 31.09c; cast, 30.12c.

Copper Cyanide: 70-71% Cu, 100-lb drums, 46.00c, fob Niagara Falls, N. Y.

Sodium Cyanide: 96-98%, ½-oz ball, in 200 lb drums, 1 to 900 lb, 16.00c; 1000 to 19,900 lb, 15.00c, fob Niagara Falls, N. Y.

Copper Carbonate: 54-56% metallic Cu; 50 lb bags, up to 250 lb, 26.25c; over 250 lb, 25.25c, fob Cleveland.

Nickel Anodes: Rolled oval, carbonized, carloads, 56.00c; 10,000 to 30,000 lb, 57.00c; 3000 to 10,000 lb, 58.00c; 500 to 3000 lb, 59.00c; 100 to 500 lb, 61.00c; under 10 lb, 64.00c; fob Cleveland. Add 1 cent for rolled depolarized.

Nickel Chloride: 100-lb kegs, 26.50c; 275-lb, or 500-lb bbl, 24.50c, fob Cleveland.

Tin Anodes: Bar, 1000 lb and over 119.00c; 500 to 999 lb, 119.50c; 200 to 499 lb, 120.00c; less than 200 lb, 121.50c; ball, 1000 lb and over, 121.25c; 500 to 999 lb, 121.75c; 200 to 499 lb, 122.25c; less than 200 lb, 123.75c fob Sewaren, N. J.

Sodium Stannate: 25 lb cans only, less than 100 lb, to consumers 71.8c; 100 or 500 lb drums only, 100 to 500 lb, 63.8c; 600 to 1900 lb, 61.2c; 2000 to 9900 lb, 59.4c. Prices fob Sewaren, N. J.

Zinc Cyanide: 100-lb drums 39.25c, fob Cleveland; 39.00c, Detroit; 38.00c, fob Philadelphia.

Stannous Sulphate: Less than 2000 lb, in 100 lb kegs, 100.00c, in 400 lb bbl. 99.00c; more than 2000 lb, in 100 lb kegs, 99.00c, in 400 lb bbl, 98.00c.

Scrap Metals

BRASS MILL ALLOWANCES

(Based on 23.50c, Conn., for copper)

Prices in cents per pound for less than 15,000 lb fob shipping point.

	Clean Heavy	Rod Ends	Clean Turnings
Copper	21.125	21.125	20.375
Yellow brass	18.000	17.750	17.125
Commercial Bronze			
95%	20.125	19.875	19.375
90%	19.750	19.500	19.000
Red brass			
85%	19.750	19.500	19.000
80%	19.500	19.250	18.750
Best Quality (71-79%)	19.000	18.750	18.250
Muntz Metal	17.250	17.000	16.500
Nickel, silver, 10% ..	19.625	19.375	9.813
Phos. bronze, A.	22.625	22.375	21.375
Naval brass	17.750	17.500	17.000
Manganese bronze ...	17.750	17.500	16.875

BRASS INGOT MAKERS BUYING PRICES

(Cents per pound, fob shipping point, carload lots)

No. 1 copper 19.50-19.75, No. 2 copper 18.50-18.75, light copper 17.50-17.75, composition red brass 16.25-16.50, auto radiators 13.75, heavy yellow brass 12.00-12.25, brass pipe, 13.00-13.25.

REFINERS' BUYING PRICES

(Cents per pound, delivered refinery, carload lots)

No. 1 copper 20.25-20.50, No. 2 copper 19.25-19.50, light copper 18.25-18.50, refinery brass (60% copper), per dry copper content 18.50.

DEALERS' BUYING PRICES

(Cents per pound, New York, in ton lots or more)

Copper and Brass: Heavy copper and wire No. 1 17.50-18.00, No. 2 16.50-17.00, light copper 15.50-16.00, No. 1 composition red brass 14.00-14.50, No. 1 composition turnings 13.50-14.00, mixed brass turnings 8.25-8.50, new brass clippings 13.00-14.00, No. 1 brass rod turnings 10.50-11.00, light brass 7.50-8.00, heavy yellow brass 10.00-10.25, new brass rod ends 11.00-11.50, auto radiators, unsweated 12.00-12.25, cocks and faucets 11.25-11.75, brass pipe 11.50-11.75.

Lead: Heavy 18.00-18.50, battery plates 12.00-12.25, linotype and stereotype 18.00-18.50, electrotype 16.50-17.00, mixed babbitt 15.75-16.25, solder joints, 19.75-20.25.

Zinc: Old zinc 7.75-8.25, new die cast scrap 7.75-8.25, old die cast scrap 5.00-5.50.

Tin: No. 1 pewter 65.00-67.00, block tin pipe 83.00-84.00, No. 1 babbitt 51.00-54.00, siphon tops 50.00-52.00.

Aluminum: Clippings 2S 13.00-13.50, old sheets 10.00-10.50, crankcase 10.00-10.50, borings and turnings 5.50-6.00, pistons, free of struts, 10.00-10.50.

OPEN MARKET PRICES, IRON AND STEEL SCRAP

Prices are dollars per gross ton, including broker's commission, delivered at consumer's plant except where noted.

PITTSBURGH

No. 1 Heavy Melt. Steel	$42.50-43.00*
No. 2 Heavy Melt. Steel	42.50-43.00*
No. 1 Busheling	42.50-43.00*
Nos. 1, 2 Bundles	42.50-43.00
No. 3 Bundles	40.50-41.00
Machine Shop Turnings	37.50-38.00
Mixed Borings, Turnings	37.50-38.00
Short Shovel Turnings	39.50-40.00
Cast Iron Borings	39.50-40.00
Bar Crops and Plate	49.00-50.00
Low Phos. Steel	49.50-50.00
Heavy Turnings	39.50-40.00

Cast Iron Grades

No. 1 Cupola	65.00-66.00
Machinery Cast	72.00-73.00
Charging Box Cast	61.00-62.00
Heavy Breakable Cast	60.00-61.00
Malleable	74.00-75.00
Brake Shoe	57.50-58.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	43.50-44.00
R.R. Malleable	75.00-80.00
Axles	55.25-56.25
Rails, Rerolling	59.00-60.00
Rails, Random Lengths	55.00-57.00
Rails, 3 ft and under	62.00-63.00
Rails, 18 in. and under	63.00-64.00
Railroad Specialties	60.25-61.25
Uncut Tires	**54.50-55.00**
Angles, Splice Bars	53.00-54.00

* Plus applicable freight springboard.

CLEVELAND

No. 1 Heavy Melt. Steel	**$42.00-42.50***
No. 2 Heavy Melt. Steel	**42.00-42.50***
No. 1 Busheling	**42.00-42.50***
Nos. 1 & 2 Bundles	**42.00-42.50***
Machine Shop Turnings	**37.00-37.50**
Mixed Borings, Turnings	**36.50-38.50**
Short Shovel Turnings	**38.00-38.50**
Cast Iron Borings	**38.00-38.50**
Bar Crops and Plate	**47.00-47.50**
Punchings & Plate Scrap	**47.00-47.50**
Heavy Turnings	**42.00-43.00**
Alloy Free Turnings	**40.00-41.00**
Cut Structurals	**48.50-51.50**

Cast Iron Grades

No. 1 Cupola	74.00-76.00
Charging Box Cast	64.00-66.00
Stove Plate	63.00-65.00
Heavy Breakable Cast	55.00-60.00
Unstripped Motor Blocks	62.00-64.00
Malleable	79.00-81.00
Brake Shoes	52.00-53.00
Clean Auto Cast	75.00-77.00
No. 1 Wheels	64.00-66.00
Burnt Cast	57.00-59.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	**43.00-44.00***
R.R. Malleable	**80.00-82.00**
Rails, Rerolling	**60.00-66.00**
Rails, Random Lengths	**60.00-63.00**
Rails, 3 ft and under	**63.00-66.00**
Cast Steel	**57.00-59.00**
Railroad Specialties	**60.00-62.00**
Uncut Tires	58.00-59.00
Angles, Splice Bars	61.00-64.00

* Plus applicable freight springboard on earmarked material.

VALLEY

No. 1 Heavy Melt. Steel	$42.50-43.00*
No. 2 Heavy Melt. Steel	42.50-43.00
No. 1 Bundles	42.50-43.00
Machine Shop Turnings	37.00-39.00
Short Shovel Turnings	39.00-39.50
Cast Iron Borings	38.50-39.00
Low Phos.	48.50-50.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	43.00-44.00*

* Plus applicable freight springboard.

MANSFIELD

Machine Shop Turnings	$37.50-38.00
Short Shovel Turnings	39.50-40.00

CINCINNATI

No. 1 Heavy Melt. Steel	$42.00
No. 2 Heavy Melt. Steel	42.00
No. 1 Busheling	42.00
Nos. 1 & 2 Bundles	42.00
Machine Shop Turnings	36.00
Mixed Borings, Turnings	36.00
Short Shovel Turnings	38.00
Cast Iron Borings	37.00

Cast Iron Grades

No. 1 Cupola Cast	63.00
Charging Box Cast	53.00
Heavy Breakable Cast	59.00
Stove Plate	55.00
Unstripped Motor Blocks	56.00
Brake Shoes	50.00
Clean Auto Cast	63.00
Drop Broken Cast	71.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	43.00
R.R. Malleable	75.00
Rails, Rerolling	62.00
Rails, Random Lengths	58.00
Rails, 18 in. and under	63.00

DETROIT

(Brokers' buying prices, fob shipping point)

No. 1 Heavy Melt. Steel	**$37.50-38.00**
No. 1 Busheling	37.50-38.00
Nos. 1 & 2 Bundles	37.50-38.00
No. 3 Bundles	37.50-38.00
Machine Shop Turnings	31.50-32.00
Mixed Borings, Turnings	31.50-32.00
Short Shovel Turnings	32.50-33.00
Cast Iron Borings	32.50-33.00
Punchings & Plate Scrap	**42.50-43.00**

Cast Iron Grades

No. 1 Cupola Cast	60.00-65.00
Heavy Breakable Cast	54.00-59.00
Clean Auto Cast	60.00-65.00

BUFFALO

No. 1 Heavy Melt. Steel	$48.00-49.00
No. 2 Heavy Melt. Steel	**41.75-42.25**
No. 1 Busheling	**41.75-42.25**
No. 1 & 2 Bundles	**41.75-42.25**
Machine Shop Turnings	**36.75-37.25**
Mixed Borings, Turnings	**36.75-37.25**
Cast Iron Borings	**37.75-38.25**
Short Shovel Turnings	**38.75-39.25**
Low Phos.	49.00-51.00

Cast Iron Grades

Mixed Cupola	**65.50-66.50**
No. 1 Cupola	**68.00-69.00**
Heavy Breakable Cast	**55.00-57.00**
Malleable	**70.00-75.00**
Clean Auto Cast	**62.00-64.00**

Railroad Scrap

Rails, 3 ft. and under	**61.00-62.00**
Railroad Specialties	**60.00-61.00**

PHILADELPHIA

No. 1 Heavy Melt. Steel	**$45.00-45.50**
No. 2 Heavy Melt. Steel	**41.50**
No. 1 Busheling	**41.50**
Nos. 1 & 2 Bundles	**41.50**
No. 3 Bundles	**39.50**
Machine Shop Turnings	**37.50**
Mixed Borings, Turnings	**37.50**
Short Shovel Turnings	**38.50**
Bar Crop and Plate	**50.00-51.00**
Punchings & Plate Scrap	**50.00-51.00**
Cut Structurals	**50.00-51.00**
Elec. Furnace Bundles	**47.00-48.00**
Heavy Turnings	**45.50-46.50**
No. 1 Chemical Borings	**46.00-46.50**

Cast Iron Grades

No. 1 Cupola Cast	63.00-65.00
No. 1 Machinery Cast	67.00-68.00
Charging Box Cast	64.00-65.00
Heavy Breakable Cast	62.00-62.50
Unstripped Motor Blocks	59.50
Malleable	76.00-78.00
Clean Auto Cast	64.00-65.00
No. 1 Wheels	69.00-70.00

NEW YORK

(Brokers buying prices, fob shipping point)

No. 1 Heavy Melt. Steel	$39.00
No. 2 Heavy Melt. Steel	37.00
No. 1 Busheling	**37.00**
Nos. 1 & 2 Bundles	**37.00**
No. 3 Bundles	**35.00**
Machine Shop Turnings	**29.00-29.50**
Mixed Borings, Turnings	**29.00-29.50**
Short Shovel Turnings	**30.00-31.50**
Punchings & Plate Scrap	**42.00-42.50**
Cut Structurals	**42.00-42.50**
Elec. Furnace Bundles	**42.00-42.50**

Cast Iron Grades

No. 1 Cupola Cast	**57.00-58.00**
Charging Box Cast	57.00-58.00
Heavy Breakable	58.00
Unstripped Motor Blocks	**53.50-54.50**
Malleable	**68.00-69.00**

BOSTON

(Fob shipping point)

No. 1 Heavy Melt. Steel	$38.90
No. 2 Heavy Melt. Steel	34.40
No. 1 Bundles	34.40
No. 1 Busheling	34.40
Machine Shop Turnings	29.90
Mixed Borings, Turnings	29.90
Short Shovel Turnings	31.90
Bar Crops and Plate	40.00-41.00
Punchings & Plate Scrap	40.00-41.00
Chemical Borings	38.00-39.00

Cast Iron Grades

No. 1 Cupola Cast	60.00-65.00
Heavy Breakable Cast	55.00-58.00
Stove Plate	54.00-55.00
Unstripped Motor Blocks	50.00-52.00
Clean Auto Cast	54.00-56.00

CHICAGO

No. 1 Heavy Melt. Steel	$41.50-42.00
No. 2 Heavy Melt. Steel	41.50-42.00
No. 1 Bundles	41.50-42.00
No. 2 Bundles	41.50-42.00
No. 3 Bundles	39.50-40.00
Machine Shop Turnings	36.50-37.00
Mixed Borings, Turnings	36.50-37.00
Short Shovel Turnings	38.50-39.00
Cast Iron Borings	37.50-38.00
Bar Crops and Plate	47.00-48.00
Punchings	48.00-49.00
Elec. Furnace Bundles	42.50-43.00
Heavy Turnings	41.00-41.50
Cut Structurals	46.50-47.00

Cast Iron Grades

No. 1 Cupola Cast	70.00-71.00
Clean Auto Cast	70.00-71.00
No. 1 Wheels	59.00-61.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	45.00-46.00
Malleable	81.00-82.00
Rails, Rerolling	66.00-67.00
Rails, Random Lengths	57.00-58.00
Rails, 3 ft and under	60.00-61.00
Rails, 18 in. and under	62.00-63.00
Railroad Specialties	55.50-56.50
Angles, Splice Bars	56.50-57.50

ST. LOUIS

No. 1 Heavy Melt. Steel	**$44.00-45.00**
No. 2 Heavy Melt. Steel	**40.00-41.00**
Machine Shop Turnings	**35.00-36.00**
Short Shovel Turnings	**36.50-37.50**

Cast Iron Grades (Fob shipping point)

No. 1 Cupola Cast	65.00-66.00
Mixed Cast	56.00-58.00
Heavy Breakable Cast	59.00-60.00
Brake Shoes	60.00-61.00
Clean Auto Cast	65.00-67.00
Burnt Cast	59.00-60.00

Railroad Scrap

R. R. Malleable	71.00-72.00
Rails, Rerolling	63.00-65.00
Rails, Random Lengths	56.00-59.00
Rails, 3 ft and under	60.00-61.00
Uncut Tires	51.00-52.00
Angles, Splice Bars	54.00-56.00

BIRMINGHAM

No. 1 Heavy Melt. Steel	$39.50
No. 2 Heavy Melt. Steel	39.50
No. 1 Busheling	39.50
Nos. 1 & 2 Bundles	39.00
No. 3 Bundles	37.00
Long Turnings	24.50
Short Shovel Turnings	26.00-27.00
Cast Iron Borings	25.00
Bar Crops and Plate	40.00
Cut Structurals	38.50

Cast Iron Grades

No. 1 Cupola Cast	63.00
Stove Plate	60.00-62.00
No. 1 Wheels	59.00-61.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	38.00
R.R. Malleable	nom.
Axles, Steel	50.00
Rails, Rerolling	53.00-55.00
Rails, Random Lengths	45.00-48.00
Rails, 3 ft and under	53.00-55.00
Angles and Splice Bars	52.00-53.00

SAN FRANCISCO

No. 1 Heavy Melt. Steel	*27.50
No. 2 Heavy Melt Steel	*27.50
No. 1 Busheling	*27.50
Nos. 1 & 2 Bundles	*27.50
No. 3 Bundles	*24.50
Machine Shop Turnings	*18.00
Bar Crops and Plate	*27.50
Cast Steel	*27.50
Alloy Free Turnings	*18.00
Cut Structurals	*27.50

Cast Iron Grades

No. 1 Cupola Cast	50.00-65.00

Railroad Scrap

No. 1 Heavy Melting	*28.50
Axles	*34.00
Rails, Random Lengths	*29.00

* Fob California shipping point.

SEATTLE

No. 1 Heavy Melt. Steel	$27.50
No. 2 Heavy Melt. Steel	27.50
No. 1 Busheling	27.50
Nos. 1 & 2 Bundles	27.50
No. 3 Bundles	24.50
Machine Shop Turnings	21.00-22.50
Mixed Borings, Turnings	21.00-22.50
Punchings & Plate Scrap	35.00
Cut Structurals	26.00-28.00

Cast Iron Grades

No. 1 Cupola Cast	45.00
Heavy Breakable Cast	35.00
Stove Plate	30.00
Unstripped Motor Blocks	32.50
Malleable	40.00
Brake Shoes	35.00
Clean Auto Cast	40.00
No. 1 Wheels	37.50-40.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	28.50
Railroad Malleable	30.00
Rails, Random Lengths	30.00-32.00
Angles and Splice Bars	28.50

LOS ANGELES

No. 1 Heavy Melt. Steel	$27.50
No. 2 Heavy Melt. Steel	27.50
Nos. 1 & 2 Bundles	27.50
Machine Shop Turnings	20.00
Mixed Borings, Turnings	15.50-16.00
Punchings & Plate Scrap	28.00
Elec. Furnace Bundles	28.00

Cast Iron Grades

No. 1 Cupola Cast	55.00-65.00

HAMILTON, ONT.

(Ceiling prices, delivered)

Heavy Melt.	$23.00
No. 1 Bundles	23.00
Mechanical Bundles	21.00
Mixed Steel Scrap	19.00
Mixed Borings, Turnings	17.00
Rails, Remelting	23.00
Rails, Rerolling	26.00
Bushelings	17.50
Bushelings, new factory, prep'd	21.00
Bushelings, new factory, unprep'd	16.00
Short Steel Turnings	17.00

Cast Iron Grades*

No. 1 Cast	48.00-50.00
No. 2 Cast	44.00-45.00

* Removed from price control Aug. 9, 1947; quoted on basis of fob shipping point.

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Press, Pump, Tank . . . all in one compact assembly

Available with Automatic Control

Both two and three ram models are available with automatic controls . . . and are recommended when the nature of the scrap warrants such application and where high output is desired.

You conserve floor space and piping in plants and mills where space is limited . . . and at the same time, handle high tonnages at extremely low operating cost.

Pioneers in the metal baling field, LOGEMANN engineers have embodied the features proved through actual operation to be essential to constant, uninterrupted service. These same engineers are prepared to offer suggestions as to operating layout and installation of any unusual or specific need. Present your problem to them, stating the nature of your scrap and the tonnage desired. There is no obligation.

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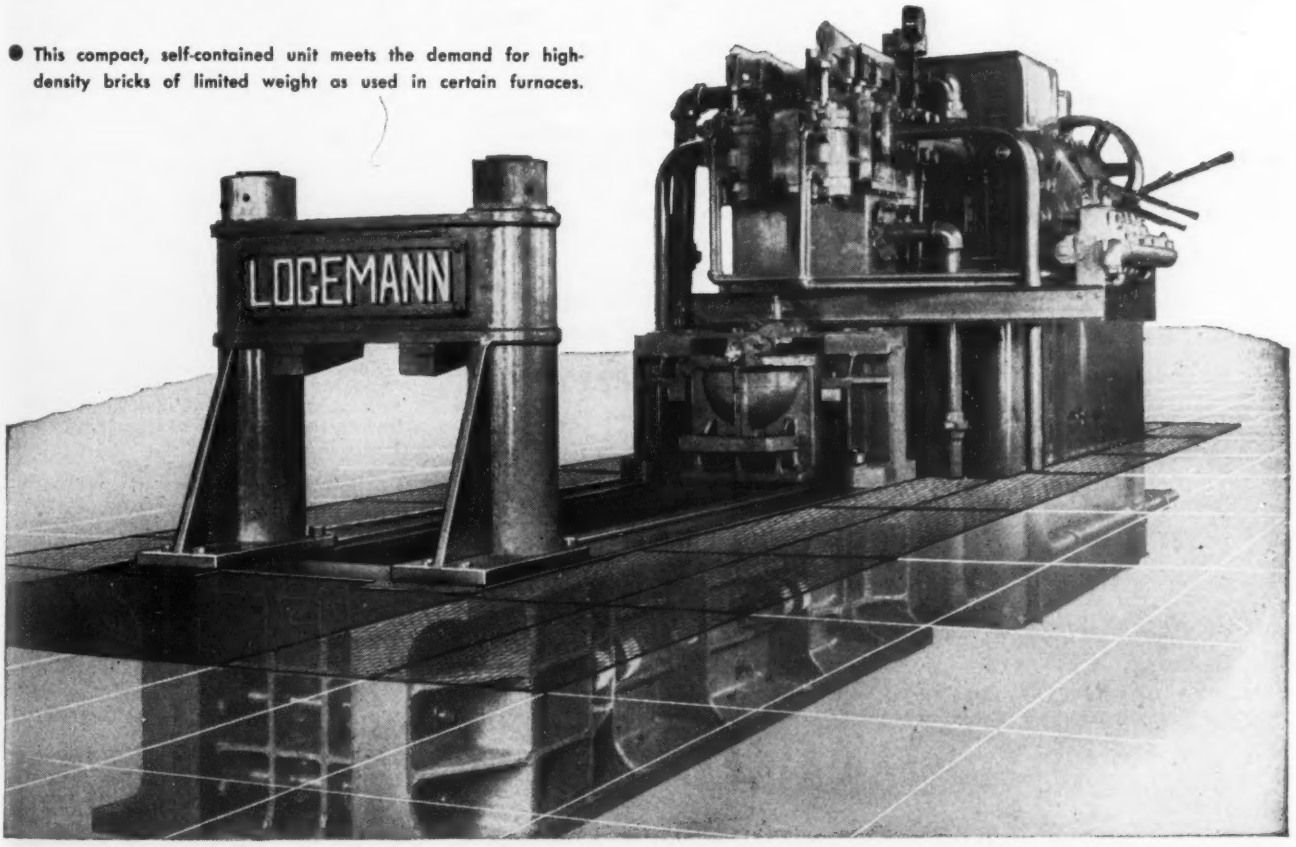
● This compact, self-contained unit meets the demand for high-density bricks of limited weight as used in certain furnaces.



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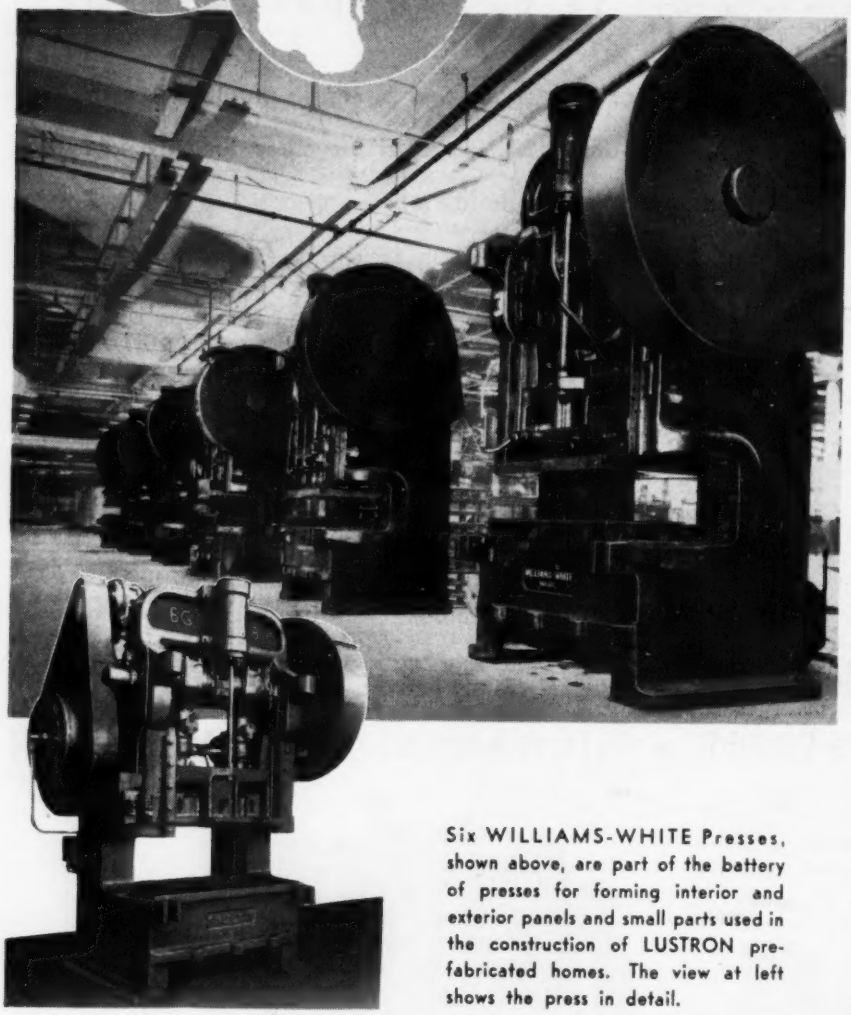
WELL KNOWN . . .
ALL OVER THE WORLD



Six WILLIAMS-WHITE Presses, shown above, are part of the battery of presses for forming interior and exterior panels and small parts used in the construction of LUSTRON prefabricated homes. The view at left shows the press in detail.

WILLIAMS-WHITE Production Machines are custom built to meet your particular needs . . . designed to lower operating costs and do your work more efficiently. The experience gained in nearly 100 years building the basic tools of industry is available to you through our staff of engineers and designers.

Write us, giving as much information as possible about the tools you need, and we will send detailed specifications without obligation on your part.

MAKERS OF PRECISION PRODUCTION TOOLS FOR NEARLY 100 YEARS

WILLIAMS-WHITE & Co.

MOLINE, ILLINOIS

Sheets, Strip . . .

Producers seeking method for checking on ultimate consumption of steel

Sheet Prices, Page 116

Chicago — Since publication of the Macy committee's report with its suggestion that mills adopt better policing methods to prevent entrance of steel into the gray market, steel producers are genuinely interested in finding a satisfactory method for checking on ultimate consumption. One interest states that even if personal supervision of each customer's plant were possible, the customer would feel his integrity was being questioned and would resent the intrusion strongly. Elimination of the gray market could be effected immediately, this producer declares, if buying of material at premium prices were to cease. This, obviously, is the simple solution to the problem, and would add importantly to sheet and strip supply in normal distribution channels. However, logic fails with a consumer who needs steel immediately to keep operating. The "reward" system advocated in the report for buyers who turn in the names of gray market suppliers in return for which their needs may be met by producers conceivably will overcome some reticence against revealing questionable practices, but, on the other hand, it may turn into an incentive for steel consumers to enter the gray market in the hopes that by so doing they can eventually establish themselves on mill books.

Inventory time at many Chicago manufacturers is finding steel stocks lower and more unbalanced than at the same time last year. While there has been some slackening in buying by a few companies engaged in seasonal business—road building equipment and air conditioning apparatus manufacturers, for example—the overall pressure for more steel is greater than ever.

Pittsburgh — Weirton Steel Co. has adjusted extras on hot-rolled sheets and strip in line with those put into effect by the Great Lakes Steel Corp. on Oct. 1 (STEEL, Oct. 18, p. 232). Carnegie-Illinois Steel Corp. has completed its modernization program at Vandergrift for increased silicon sheet production. Operation of the outmoded galvanizing facilities has been discontinued at that mill and a continuous galvanizing line is in operation at the company's Irvin Works.

Philadelphia — Sheet and strip producers generally are studying advances in extras announced recently by one mid-western seller and followed by another affiliated company, but have not taken action up to this time. Producers of stainless also are reviewing schedules announced over recent weeks, with the possibility that some revisions may be made. Special attention is being directed to the new jobber discounts, as established by some producers, and which have been severely criticized by distributors.

Air Materiel Command, Dayton, is inquiring for 1093 tons of sheets, including 617 tons aluminum alloy and

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This new Penflex development offers all of the ruggedness of the well-known Penflex interlocked construction . . . plus an inner lining of metal that makes the inside of the tubing free of any obstructions . . . allows smooth, easy flow of material . . . reduces friction to a minimum. At the same time, this extra lining greatly reinforces the tubing without materially reducing the flexibility. Result is a new tubing that offers every industry-moving material pneumatically—real savings in time, money and maintenance. Penflex "TWIN-LOK" is just another of the many developments of Penflex "Flexineering" which offers you complete service and products for the flexible, leak-proof transmission of liquids, air, gas or light solids. Penflex has a complete line of flexible metal hose, tubing and couplings from ⅛" I. D. to 30" for all purposes.

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Mr. Barry found a simple, low-cost solution by providing heat directly at working level with Dravo *Counterflo* Heaters. Four heaters, one on each wall, blanket the factory working area with a draft-free "cross-fire" of warm air above the heads of the workers. Heat distribution is uniform at 72 to 75 degrees throughout.

Completely automatic, the Dravo *Counterflo* Heaters require only a fuel line, power line and short vent stack—no boiler room. The thermostat is lowered or shut off completely at night for additional, important economies.

Dravo heaters produce warm air quickly. Sturdy, carefully engineered construction, plus a stainless steel combustion chamber, minimize maintenance cost. Equally efficient with oil or gas, sizes ranging from 400,000 to 2,000,000 BTU per hour output are available. A touch of the selector switch converts them immediately to high-capacity air-circulating units for summer use.

If you would like more information to help solve your own heating problems, write for Bulletin JD-516, Heating Section, Dravo Corporation, Dravo Building, Pittsburgh 22, Pennsylvania.

Living room comfort speeds production and cuts absenteeism in this modern garment manufacturing plant. As the manager, Mr. Barry says, "Women employees cannot be expected to operate sewing machines properly if their hands and feet are cold or if they are otherwise uncomfortable."

Dravo also manufactures the *DRAVO CRANE CAB COOLER* for air conditioning hot-metal crane cabs

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476 tons low carbon hot-rolled.

Cincinnati — District sheet mills expect only slight dislocation of fourth quarter schedules because of recent voluntary allotment tonnage. This will come in December rolling, but mill interests are still confident carryover, because of reduced quotas this quarter, will be trimmed drastically by Jan. 1. Pressure for deliveries has not relaxed despite the well-sustained production levels in recent weeks.

Birmingham — Sheet consumers indicate no improvement in availability of wanted grades. Mills are trying to reduce carryovers and have trimmed quotas slightly. Pressure for sheets, however, remains as great as ever. Strip production, while not at capacity, is substantial.

Plates . . .

Plate Prices, Page 117

Boston — Substantial carryovers in plates will limit first quarter allocations, notably those for January. Certified orders are heavier for shipbuilding, including destroyers, with more high tensile volume included. Trend toward monthly, rather than quarterly, allocations probably will be maintained during first quarter, 1949. An end to voluntary distribution, strictly defense production excepted, at the end of February will in no way lower demand in near future from industries now favored, nor will one additional ton of steel be produced. Conceivably an improved job of distribution might be accomplished, for many have questioned how long tonnage can be orderly distributed under partial controls, voluntary or otherwise, and with one-third of plate output currently taken up by controlled volume.

Philadelphia — Plate requirements continue to hold at record peacetime levels, with no easing in supply in the foreseeable future. Mills are literally swamped with requests for tonnage and in the light gages, 3/16 and 1/4 in., they are able to meet only a small percentage of present demand. Shipbuilding and rearmament work is expected to be increasingly felt over coming months, all of which will add to the stringency. Oil industry continues to press for far more tonnage that it is receiving, although it is now getting substantially more than it did prewar.

Birmingham — Fabricators are still unable to obtain sufficient plates to maintain production at scheduled rates. Tank production continues at a high level.

Reinforcing Bars . . .

Reinforcing Bar Prices, Page 116

Seattle — Rolling mill capacity is heavily taxed, little headway being made against backlogs of reinforcing bar orders as new business is pressing. It is impossible to figure all contracts pending and mills are doing their best to take care of steady buyers. First quarter business is not being sought as the main objective is to clean up pending orders.

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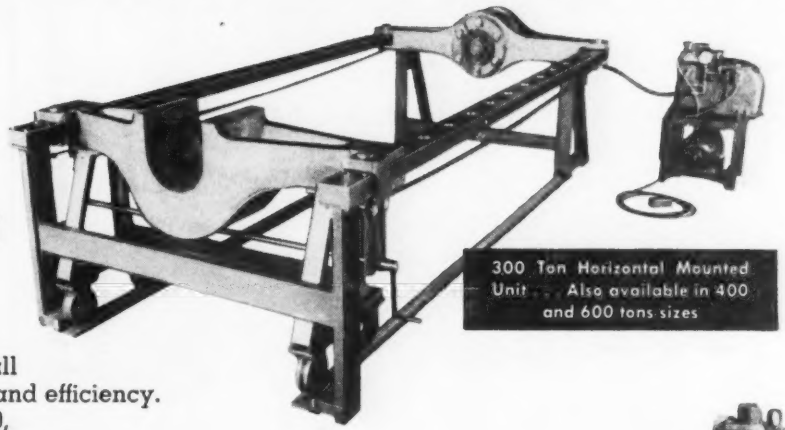

300 Ton Horizontal Mounted Unit . . . Also available in 400 and 600 tons sizes

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Each Rodgers press is designed and constructed for convenience in assembling and disassembling as well as operation. Head member, yoke abutment and hydraulic pump are independent units easily assembled where needed.

The Rodgers Portable with horizontal frame mounting . . . Made in 100 and 200 tons capacities

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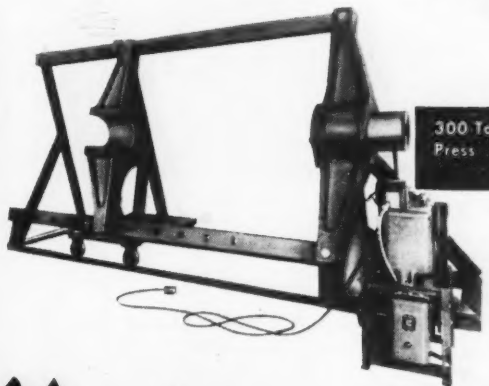

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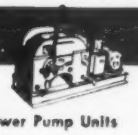

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PAY-OFF, SLITTER
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PAY-OFF REEL can be of 5 to 20,000 lbs capacity and coil width can be from 24" to 60".

SLITTER can be built in widths 18"—84". To slit gages .001"—.187"

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Units can be supplied individually; delivery in approximately six months.

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MANUFACTURERS OF:
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Wire . . .

Wire Prices, Page 117

New York — Users of low-carbon bright wire frequently resort to substitutes, a costly move in some cases. To illustrate: A buckle manufacturer, forming his product of galvanized, strips the zinc coating from the wire and then plates it for finish; normal raw material for this consumer is low-carbon bright basic. More producers are curtailing low-carbon wire production, although demand is heavier, forcing some wire formers to seek new sources of supply. Only bedding grades are inclined to lag below peak levels. There is a sharp increase in buying of wire for welding electrodes and backlogs are increasing; wool manufacturers continue to press for wire. An increase in galvanized extras is expected, tied in with higher zinc costs. No material increase on rod tonnage is likely with producers drawing more from their own semifinished capacity. In wire products jobbers have a balanced supply only in wire fencing.

Boston — Wire bookings for first quarter are being made sparingly. While there are a few soft spots, indications are allocation of carbon grades will be no heavier than in the present period. Music wire can be shipped from stock in more sizes and upholstery spring grades have not recovered fully from an earlier slump. Producers of razor blade steel have caught up with demand and earlier feverish buying is over. In other directions buying is unabated, notably by the automotive industry; pressure for valve spring wire is heaviest this year. In view of better balanced supply at retail levels on more light consumer goods, sustained heavy pressure for clock spring stock is noteworthy; clock-makers are usually sensitive to end-buying trends and any slack is normally promptly reflected at the steel supply level. Now, some are pressing for clock spring wire to maintain production. Middle-size ranges in heading wire are still critical with screw manufacturers; available rods are processed for those sizes with finished wire more flexible for the heavier end. Demand for screws is spasmodically lower with pressure easing on some sizes on which deliveries are slightly improved.

Chicago — Slowing down of operations in segments of the furniture manufacturing business is noted by a spottiness in demand for spring wire. Call for bale ties, baling wire and poultry netting is also reported off. There has been no slackening in demand for other wire products, however, with fastener producers pressing particularly hard for increased tonnages to cover requirements.

Memphis, Tenn. — Tennessee Coal, Iron & Railroad Co., Fairfield, Ala., has been awarded contract for 4500 tons steel wire strand by the Memphis district Corps of Engineers; 3350 tons went at 10.69c per pound and the balance at 10.64c f.o.b.. At $4.74 per square, Allegheny Ludlum Steel Corp., Pittsburgh, was awarded 456,000 squares non-corrosive reinforcing fabric.

Structural Shapes . . .

Structural Shape Prices, Page 117

Philadelphia — While local structural demand is spotty, fabricating shops have sizable backlogs and continue to be primarily concerned over dearth of steel. They are having difficulty balancing stocks and one fabricator at Phoenixville, Pa., is temporarily suspending operations because of this reason. Shape producers have not been able to maintain quotas at even the average rate of the past three months and one seller has just recently announced a cut of 50 per cent in December allotments.

New York — Sizable structural tonnage is active, with American Bridge Co. low on 14,000 tons for a state viaduct in Kings county, New York, and with early action also expected in the award of approximately 2600 tons for a naval hospital at St. Albans, Long Island, and 2000 tons for state grade crossing work at Rockville Center, Long Island.

Chicago — Estimate by one shape and plate producer here that first quarter quotas will be reduced as much as 35 per cent spells greater hardship for consumers and fabricators, and lends weight to opinion that interest in new large-scale industrial construction will necessarily wane further than is presently the case. The quota cut will be made in another attempt by the mill to eliminate its carryover tonnage and move into a current position on orders. Most pending and recently awarded jobs in the area continue to be for relatively small tonnages.

Birmingham — Most construction work here is limited generally to relatively small public works with the exception of the new Birmingham city hall and the Childersburg paper mill. The aggregate of shapes is fairly large. Several projected construction jobs have been held in abeyance, while several others have been abandoned.

Seattle — Fabricators have fair backlogs and in spite of shortages of materials are maintaining normal operations. It is impossible to figure larger jobs involving heavy tonnages but there is a steady demand for small contracts involving less than 100 tons each. Two local plants have nearly 1000 tons aboard strike-bound intercoastal ships, material that has been committed for current work. Shipments from mills are coming by rail. Stocks are precariously low and allocations for the first quarter are below requirements.

United Nations Awards Contracts

New York — United Nations has awarded a contract to American Bridge Co, Pittsburgh, for the furnishing and erection of the steel of the 40-story Secretariat Bldg. This will be the first structure in the permanent home of the United Nations to be built on the New York City site. About 13,000 tons of steel will be required for the Secretariat Bldg., which will be erected next spring and summer. The contract also provides for steel framing for a terrace at about street level which will connect with the Assembly Hall and other buildings to be erected by the United Nations.

BAKER TRUCK—
unloading zinc pigs saves
Hubbard & Co. 16½ man hours
per car

Baker Articulated Fork Truck leaving box car with load of zinc pigs. Hubbard & Co. saves 7 to 8 hours per car for each of 3 men on this operation.

Baker Fork Truck conserves warehouse space by high tiering and speeds loading of finished products on highway trucks.

At the Emeryville, California plant of Hubbard and Company, manufacturers of pole line hardware and electrical construction material, four Baker trucks cut handling costs to a minimum. A Baker Low Lift and two Baker Hy-Lift trucks expedite movement of material from process to process in the plant, while a Baker ARTICULATED Ford Truck unloads incoming material, conserves space by tiering, and speeds loading of highway trucks.

The ARTICULATED fork truck has made possible a saving of 16½ man hours per car in unloading zinc pigs. This work formerly required four men, whereas now one man operator, with the ARTICULATED Baker truck does the same work in 2½ hours time . . . Thus releasing three men for more productive work.

A Baker material handling engineer will gladly show you how to get more for your man-power dollar by mechanized handling.

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Baker INDUSTRIAL TRUCKS

Warehouse . . .

Warehouse Prices, Page 119

New York — Warehouse prices on stainless reflect the uneven mill price structure, but in most cases distributors are following their individual mill schedule. This makes for mixed prices and confusion. Demand for steel from warehouse is far in excess of supply with inventories low and unbalanced; lagging deliveries and lower allocations for this quarter operate against any immediate betterment. Many orders offered are of mill volume with flat-rolled, plates and structurals short of requirements. Alloys are active with replacement more uncertain as mills open books for first quarter.

Boston — Reductions in warehouse allocations parallel percentagewise those to manufacturing consumers, but in practice the impact is greater with more users pressing for warehouse steel. Some distributors have been unable to replace volume lost by mill withdrawals on certain products and in scattered instances fourth quarter quotas in hot-rolled bars are reduced more than for direct consumers. Stainless prices are confused and mixed while supply of other alloys is tightening. Plates and structurals are short, also pipe, flat-rolled and nails; allocations are down 20 per cent on the latter in spots.

Cleveland — Warehouses continue to have difficulty keeping stocks up. However, one reported a slight easing in demand for hot-rolled carbon sheets, although requirements still exceed supply. Structurals, plate and bar flats are in particularly strong demand. Pressure for alloy steels continues strong, but stainless is relatively easier and supplies are available. Also in easy supply is cold-drawn carbon seamless tubing.

Cincinnati — Warehouses are feeling the effects, by way of increasing pressure for tonnage, of the cuts made by mills in allocations to other customers for this quarter. More and more inquiries are being received from such mill customers, but jobbers' stocks are inadequate to meet the expanding demands on them. Lack of balanced inventory is one of the serious supply problems.

Birmingham — Shortage of most warehouse steel items continues acute. Inventories are lower in some instances than they have been since the end of the war.

Seattle — Jobbing houses report the market unchanged, stocks low, mill allocations reduced and considerable material idled on strike-bound ships. New shipments are coming overland at increased cost. Sheets are increasingly critical, one mill interest reporting it has not shipped its third quarter allocations and announcing no shipments in the last quarter or until previous business has been forwarded. Nails and plates are extremely tight. Wide flange sections are in particular demand as they are not being rolled on the Coast and must come from eastern producers.

Steel Bars . . .

Bar Prices, Page 116

Philadelphia — Bethlehem, Pa., producer of hot-rolled alloy steels has revised extras for alloy content and size for flat alloy bars, other than spring steel, effective Oct. 18. This follows advances recently announced by the leading Pittsburgh producer.

Chicago — Inland Steel Co., following the lead of Carnegie-Illinois Steel Corp., increased alloy grade extras an average of $5 a ton effective Oct. 19 due to increased cost of alloying elements. Five alloy bar and strip specifications are affected. Only a small percentage of the company's production is involved.

Tin Plate . . .

Tin Plate Prices, Page 117

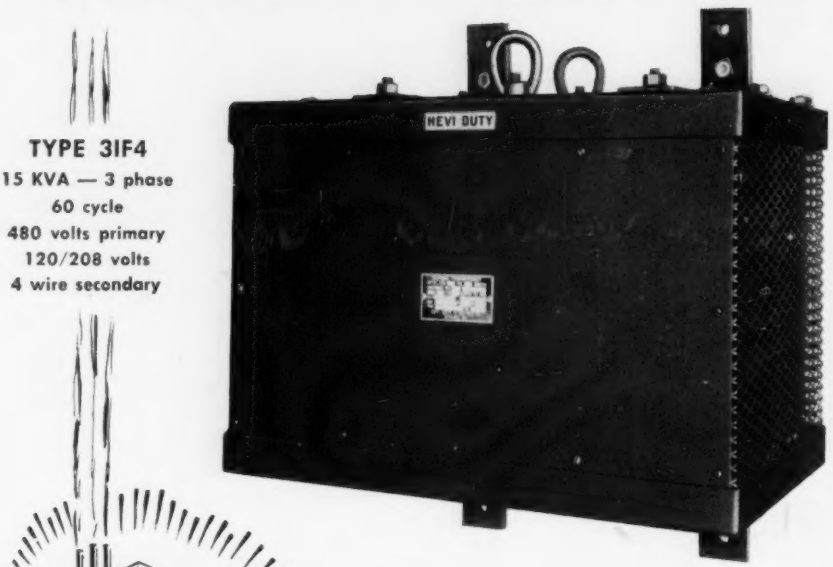
Chicago — District's tin plate output will be curtailed drastically next quarter when Inland Steel Co. moves its five-stand tandem mill preparatory to a speed-up. Although the moving process will take about three or four weeks, a total of about six weeks' production, roughly 15,000 to 20,000 tons, will be lost before the cold-reducing unit starts operations.

Rails, Cars . . .

Track Material Prices, Page 117

New York — Car business is somewhat more active, although builders look for the general overall trend to continue downward over the remainder of the year, or at least to stabilize at a low level.

HEVI DUTY ELECTRIC COMPANY



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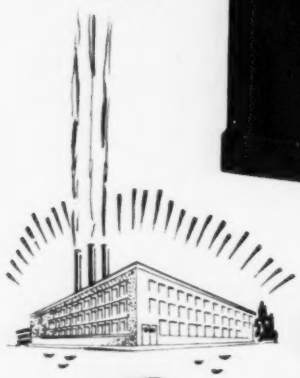

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Pig Iron . . .

Supply improves in some areas but foundry operations remain hampered by shortage of coke

Pig Iron Prices, Page 118

Boston — Within a week the Mystic furnace at Everett, Mass., will be producing foundry iron for the first time since the early July breakdown. Until first of the year, price will be $48.75, furnace. Production during the first few weeks will be spread thin among a large number of melters with low inventories. Some of the larger consumers are better off, due to receipt of high-cost foreign iron, recent arrivals of which are heavier against orders placed some weeks back. Total melt is somewhat below earlier peaks, but ratio of scrap remains high. One of the first moves most consumers will make, once more iron is available, will be toward better balance between iron and scrap.

Philadelphia — Pig iron shipments show some improvement, especially with an increasing supply of iron being received from abroad. This foreign tonnage represents a small percentage of the tonnage being consumed, yet the amount often is sufficient to take the edge off the acute stringency. Pressure pipe shops are being allotted a little more tonnage than heretofore, under the recent agreement sponsored in Washington.

Meanwhile, the coke situation is being eased somewhat by a greater flow of beehive material into the district. Some consumers, however, claim their operations are still hampered by shortage of coke which is causing more difficulty than scarcity of pig iron. Contributing primarily to the stringency in coke is the major repair program still under way at one of the district producer's plants. This program probably will not be completed before some time in January.

Pittsburgh — No significant improvement in supply of merchant iron is indicated for months ahead. Therefore, many foundries will be forced to rely on cast scrap. Despite restricted operating schedules, some grav iron foundries have made headway in their efforts to reduce order backlogs.

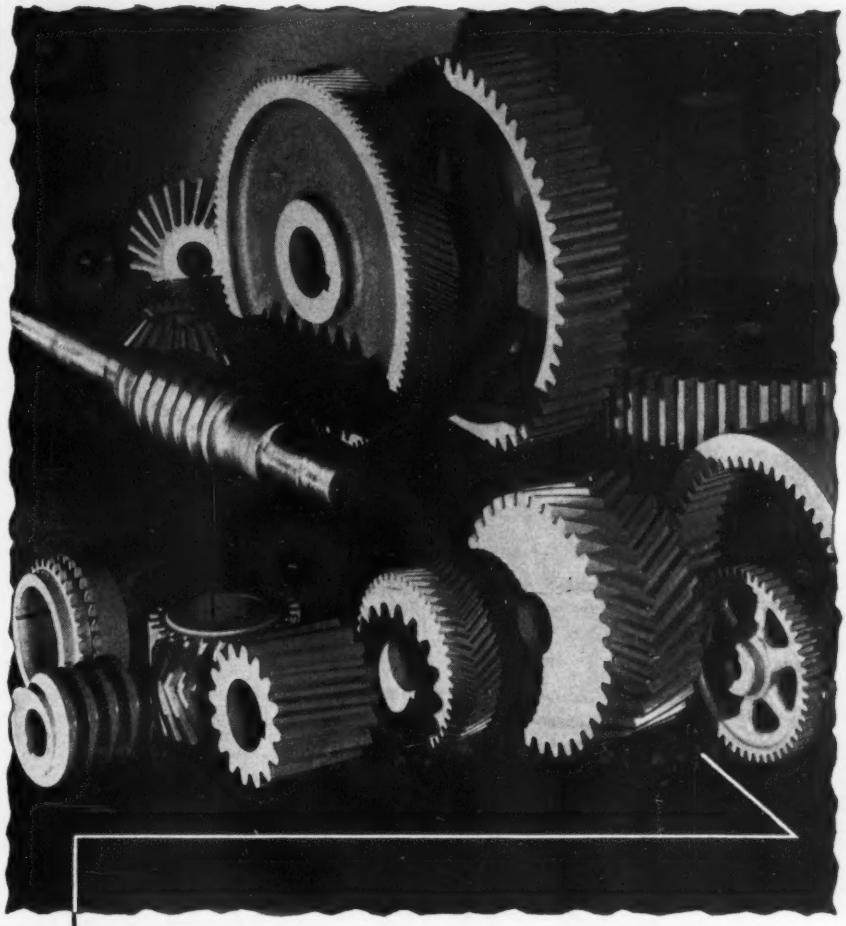
Lone Star Steel Co. is quoting, beginning as of Oct. 19, $75 per ton for No. 2 foundry iron (low phosphorus southern grade.)

Cleveland — Occasional instances are reported where declines in castings orders have resulted in a drop in foundries' demand for iron but overall pressure for merchant iron is undiminished.

Foreign and Texas iron is still coming into this area but because of its high delivered price it is used only as a supplement to local iron in order to avoid shop closings.

Republic Steel Corp. reported one of its two blast furnaces at Birmingham will be taken off about Nov. 1 for relining. Capacity of the stack is 530 tons daily. Anticipating the relining job, Republic said it has made arrangements to provide while the work is in progress the same amount of merchant iron now being shipped from its Birmingham operations.

Buffalo — Pig iron production dropped 12-1/2 points last week to 87-1/2 per cent of capacity as two



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Send note on Company Letterhead for 488-Page Catalog 41

THE HORSBURGH & SCOTT CO.

GEARS AND SPEED REDUCERS

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furnaces were shut down. One of Republic Steel Corp.'s two furnaces was taken out of service for installation of high pressure turbo-blower system. This unit will be returned to operation within eight days. Bethlehem Steel Co. took off one of its six furnaces for relining. Both furnaces were producing basic iron at the time of the shutdown, but one unit previously had been varying output between basic and foundry iron. Leading melters continue to press for iron and some have reportedly paid well above published prices. While large consumers operate as near to capacity as supplies permit, jobbing foundry demand for merchant iron is less urgent as a result of a shrinkage in reorders for castings. The overall needs of industry are still far above available supplies. Coke is in better supply and its quality has improved due to more plentiful supplies of higher grade coal.

Chicago — Receipt of foreign pig iron is helping several district foundries improve their melt proportions but not to anything like the desired iron-scrap ratios. In view of the unchanged tight domestic iron supply, however, more dependence could economically be placed on the foreign product since larger use of iron would in some cases reduce excessive scrap losses now occurring. While declining order backlogs have caused numerous foundries to seek business actively, at least one is now planning return to a full-length work-week from the four-day week currently being worked, a development which naturally intensifies the demand for iron. Obscured somewhat by the iron shortage is the foundry coke supply situation, and while this has shown some easing tonnage melted would be substantially raised if coke quality could be improved.

Cincinnati — Shipments of pig iron into this district are unimproved, and this stringency is the chief factor in the light melt. Foundry coke is none too easy, but ovens are meeting needs of regular customers. Some jobbing foundries have whittled down backlogs. Stove foundries are seasonally active, with use of cast in their products tending upward from 1947 levels.

Toledo, O.—Merchant iron price of Pickands Mather & Co. here is $45.50 per gross ton at furnace for basic, the increase having become effective Oct. 3. No. 2 foundry iron is quoted at $46.00, malleable at $46.50, and bessemer at $47.00.

Birmingham — Scarcity of pig iron is aggravated by the fact that Woodward Iron Co.'s No. 1 furnace is off for repairs. Reports are that a Republic furnace also is to come off for the same reason the last of the month. Speculation is rather rife as to price increases, but southern furnaces have thus far failed to advance prices.

Tanker Contracts Awarded

Washington — On bids opened by Standard Oil Co. of New Jersey for five high speed tankers, Newport News Shipbuilding & Dry Dock Co., Newport News, Va., was low on three and Sun Shipbuilding & Dry Dock Co., Chester, Pa., was low on two with both of the bidders figuring on basis of national defense subsidy for speed.

Slag Processing Sets New High

Washington — Iron blast-furnace slag processed in 1947 for commercial uses reached a new high of 19,581,679 short tons, valued at $19,525,482, according to the Bureau of Mines. This represented an increase of about 17 per cent above the 1946 total of 16,706,792 tons, valued at $14,869,839. Screened air-cooled slag, the major product, reached a total of 16,712,177 short tons, an increase of 17 per cent over the 1946 figure.

A notable development in 1947 was the substantial increase in the output of lightweight (expanded) slag to a total of 1,130,636 tons, an increase of 46 per cent above the tonnage reported for 1946. Although iron blast-furnace slag is produced in 13 states, most of the material processed comes from Alabama, Ohio and Pennsylvania which accounted for 68 per cent of the total tonnage reported for 1947.

The slag processors recovered 212,575 short tons of iron in 1947, an increase of 18 per cent over the 180,432 tons reclaimed in 1946.

Iron Ore . . .

Iron Ore Prices, Page 118

Cleveland—Shipments of Lake Superior iron ore from the upper lake ports increased during the week ended Oct. 18 to 2,342,440 tons from 2,062,397 tons for the preceding week and 2,290,865 for the like week a year ago, according to the Lake Superior Iron Ore Association, this city. Shipments for the latest period from United States ports totaled 2,296,997 tons, or at an average daily loading rate of 328,142 tons, compared with 1,998,425 tons at a daily rate of 285,489 tons for the preceding week.

Total shipments for the season to Oct. 18 came to 70,747,083 tons compared with 67,233,316 tons for the like period a year ago, or an increase of 3,523,767 tons. Shipments from United States ports totaled 69,820,467 tons, or an increase of 4,047,825 tons over the total for the like 1947 period.

Seattle — Barclay & Co. Inc., 1102 Northern Life Bldg., is daily expecting confirmation of the sale and shipment of 275,000 tons of iron ore from Brazil to Japan, under contract to SCAP. A representative of the local firm is in Brazil completing negotiations, the terms of which have been accepted by SCAP. The ore is to come from the Rio Doce area, state of Minas Gerais. The order will require about 30 full shiploads, charter negotiations also being under way. The ore is said to be 66 per cent iron and the delivered price is said to be about $21 gross ton. American military authorities in Japan wish prompt shipment on the ground that rehabilitation of Japan's steel industry will relieve pressure on steel producers in the United States.

Negotiations for the shipment of ore from Texada Island, B. C., near Vancouver, are reported to have failed as this property has no deep water shipping facilities and it would take

a long time to get the mine into full operation, time being the essence of the contract. Barclay & Co. has participated in the shipment of a large tonnage of coking coal from British Columbia and Washington state to Japan.

Scrap . . .

Steady imports of foreign material tend to relieve pressure on eastern markets

Scrap Prices, Page 122

Boston — More steel scrap is moving at formula prices and, while premiums are still being paid, most tonnage sells at formula levels. Demand for cast has slackened, notably from some of the larger district consumers who have built up sizable inventories. Prices for cast grades appear to have steadied after displaying slight reaction, notably heavy breakable.

New York — Steel scrap is coming out in fairly good volume and while consumers are taking in all shipments, there is not quite the pressure for scrap that there was a few weeks ago. This is ascribed in part to foreign scrap importations. Brokers' buying prices are unchanged throughout the list.

Philadelphia—Although it is difficult to appraise accurately the amount of steel scrap that eastern mills now have on hand, it appears that inventories are in substantially better shape than they were a year ago. This is due not only to a better and more stable supply of domestic material, but to the improved flow of imported scrap. Prices are steady throughout the list, this applying to cast as well as steel grades.

Leading Pittsburgh consumer is appealing for a $3 reduction in freight rates on imported scrap from eastern ports to Pittsburgh. The consumer, it is understood, proposes that the lower rates be effective for one year.

Buffalo — As the deadlock between top mill consumers and dealers continues, large quantities of scrap are moving out of this area to buyers from Pittsburgh and the Valley. Local mills are endeavoring to place additional orders at old prices but dealers claim it is impossible to accept them in view of outside demand which pays a $2 springboard on midstate shipments. Dealers have warned mills that a considerable volume of scrap, which usually moves into the Buffalo area, is again moving elsewhere. Sales which place the midstate market above the local formula are usually made to nonintegrated mills which are forced to pay premium prices because of the iron shortage. Strength was noted in other sections of the list. Recent sales necessitated adding 50 cents to the outside ranges of No. 1 heavy melting and low phos grades. The former is now $48 to $49 a ton, while low phos is $49 to $51.

Chicago — Scrap stockpiles at some of the larger mills have grown to where buying may continue light for months to come. That's an opinion held rather widely in the trade. Not so well fixed are smaller mill operators, particularly those of electric furnaces and foundries, but with many

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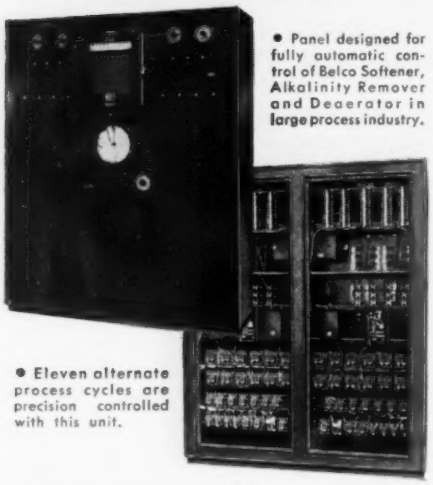

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of these the limitations on size of ground stocks are financial rather than physical. Carnegie-Illinois Steel Corp.'s local works are receiving quantities of open-hearth material from other localities which stand to benefit from German scrap now being brought in. Arrivals are expected to amount to 40,000 tons or more a month. Feeling has been widespread that foreign scrap would be of inferior quality and this feeling particularly was expressed with regard to German material because of that country's wide use of alloys in normally carbon-steel applications. However, Carnegie officials say their material is "of a much better grade than is generally available from domestic sources." Prices remain steady on steelmaking grades with railroad items continuing to fluctuate slightly.

Cleveland — Steadiness marked the scrap market here last week. Openhearth consumers could use more tonnage than they currently are getting, but foundries are inclined to hold down on their purchases at current high prices.

Cincinnati — Scrap brokers are watching for bidding this month on railroad lists since it may point the trend. Although open-hearth grades continue firm at formula, some easing in railroad items may be imminent. Sales of cast have turned spotty, a development traced to satisfactory inventories laid down by many foundries. A high rate of melt and seasonal factors give underlying strength to the market.

Pittsburgh—With mills reportedly in a good inventory position, an easier scrap price situation is seen in the offing. One large producer states that stocks are nearly double those a year ago. Another factor taking the edge off prices is the scheduled arrival of German scrap. Mills are no longer willing to make commitments for remote scrap involving springboard in excess of $2.50. Cast grades continue strong due to higher prices and scarcity of pig iron.

First boatload of 9438 tons of German steel scrap under contract made recently by Carnegie-Illinois Steel Corp. with Scrap Iron & Steel Corp., New York, is enroute to Philadelphia aboard the *Louis Pasteur* of Volla Transportation Co. This shipment, scheduled to arrive Oct. 25 and to be used by the Pittsburgh mills, is the first under the company's option to purchase more than 200,000 tons of scrap. Price to be paid for this scrap has not been made known; however, company officials state it is No. 1 heavy melting grade and that the quality is better than that generally available from domestic sources. The scrap already has been processed and is ready for use in the open hearths. Shipments are expected to arrive at the rate of 40,000 tons or more per month.

Birmingham — Prices and movement of scrap are steady. Wanted grades continue scarce, especially since the pig iron shortage is forcing use of more scrap than usual by some interests.

Seattle — Receipts of steel scrap are slightly in excess of current consumption, but the coming winter is regarded as a critical period. Shipments from the country are fairly large, although some dealers are holding back some supplies on the assumption that conditions will force prices up further. Mills are still paying $27.50 f.o.b. per gross ton and have been offering $24 f.o.b., Portland, for unprepared scrap. Dealers on the latter material are now asking $31 and $32. Other dealers, with good stocks on hand, are sitting tight for $40. Some mill buyers look for government control if the situation gets further out of hand.

Metallurgical Coke . . .

Metallurgical Coke Prices, Page 118

Pittsburgh — Movement of foundry oven coke to this district from Texas has been halted as a result of the blowing in of the Lone Star Steel Co.'s blast furnace. Shipment of Texas coke at $26.50 a ton to this district had been at a rate of 2000 tons monthly throughout August, September and the first two weeks of October. Shutting off of this supply is expected to adversely affect operations of some foundries which had been blending this coke with Connellsville beehive grades. A new battery of 63 Koppers coke ovens was placed in operation Oct. 20 at Pittsburgh Crucible's Midland Works, representing an expenditure of $6 million. Output of coke from the 184 ovens now in operation at Midland is about 1800 tons per day, an increase of 33-1/3 per cent.

Philadelphia — In point of stringency, coke is running pig iron a close race in this district. With one of the leading oven coke producers still engaged in major repairs, shortages are still increasing. Some consumers are actually finding coke more critical than iron. Increasing purchases of beehive coke have not as yet provided material relief.

Ingot Mold Prices Up

Philadelphia — Leading eastern producer has advanced prices on ingot molds $3 a ton to $67.06, Bethlehem, Pa. Similar advances have been reported by at least two other producers, with action reflecting recent increases in pig iron quotations.

Considers Buying Steel Plant

Chicago — Borg-Warner Corp., Chicago, was reported last week to be negotiating for purchase of the Warren, O. electric furnace steel plant of Copperweld Steel Co., Glassport, Pa.

Although William J. McIlvane, executive vice president of Copperweld, denied a published report that the plant had been sold to Borg-Warner, Mathew Keck, secretary-treasurer of Borg-Warner, said his company had been negotiating to purchase the Warren property but that the story that Borg-Warner had bought it was premature.

For some time, the Warren plant has been the subject of rumors of sale.

Canada . . .

Toronto, Ont. — Canadian imports of steel from the United States are slated for a sharp reduction during last quarter this year. C. D. Howe, Canadian Trade Minister, stated in Ottawa that the huge United States armament program will be reflected in smaller supply in this country of consumer goods. The Canadian government has agreed to limit its imports of iron and steel from the United States to 200,000 tons during the last three months of this year. The cut amounts to 18 per cent of the average quarterly level of the first half of 1948 and is 22 per cent less than Canada's average quarterly imports for 1947.

While there was no immediate word from defense authorities as to the effect of this cut on Canadian defense projects, the announcement came just ten days after Defense Minister Claxton told the Canadian Ordnance Association in Montreal that steel is the most important single factor governing the extent of Canada's defense preparedness and war potential.

The government is studying plans for expansion of Canada's steel industry. However, Steel Controller W. K. Ashbaugh has intimated that it may take two years to construct new furnaces to boost Canada's current domestic production of 3,100,000 of steel ingots a year.

The Canada-United States steel agreement allows Canada to apply whatever controls may be necessary to carry out the reduced import plans. Some of these controls will be exercised during the next three months.

Imports of structural steel, for example, are limited to 35,000 tons, a reduction of 34 per cent from the same period last year.

Imports of iron and steel plates are limited to 17,000 tons, 26 per cent below the 1947 level.

Imports of galvanized sheets are cut 24 per cent to 25,000 tons; pipe, tubes and skelp, 11 per cent to 30,000 tons and wire 3 per cent below the 1947 level to 8000 tons.

The agreement, however, has these elasticities:

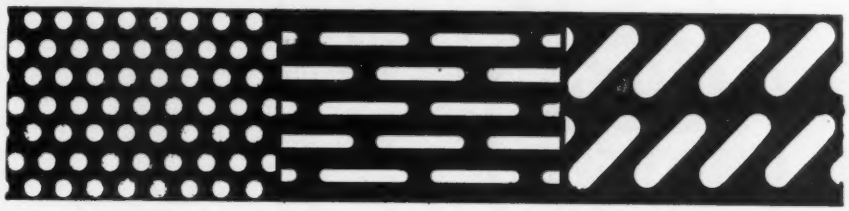
1.—Import levels will be subject to reasonable margins of tolerance including seasonal fluctuations, existence of certain contracts not yet completed and desire on both sides to avoid unnecessary development of controls.

2.—Special allowance will be made for any "special projects" which meet with the approval of both countries.

3.—Adjustment will be made for Newfoundland's needs when the island becomes Canada's 10th province.

4.—Steel sent to Canada for processing and reshipped to the United States as semifinished or finished products will not be counted under the 200,000-ton quota agreement.

The reduction in imports of steel from the United States is considered a serious blow to Canadian industry and from all sections of the Dominion have come expressions that industries whose principal raw materials are iron and steel may have to sharply reduce current operations. There is no improvement in sight in the steel situation where scarcity is hampering the construction industry.



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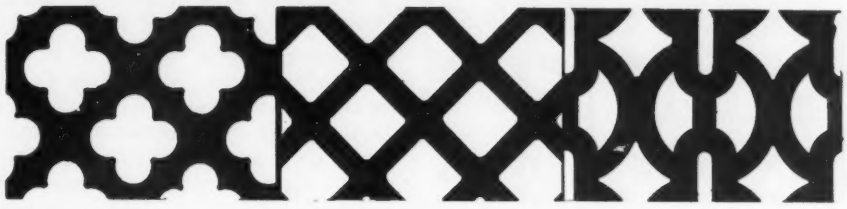

Hendrick will fabricate it to your specifications * * * * from any commercially rolled metal * * * in any gauge * * * with any shape or size of openings. Extensive plant facilities, an unsurpassed stock of dies and tools, and more than 70 years' experience in perforating metals, are at your service. Write us regarding your requirements.

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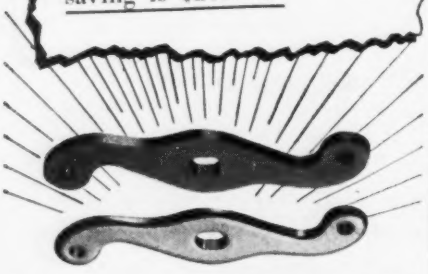

Unretouched illustration shows crank plate for fishing reel; above, before Roto-Finish deburring and finishing; below, after Roto-Finishing.

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Near Agreement on Threads

AGREEMENT on common standards for screw threads is expected to be completed in the next three months, perhaps in November, by the United States, Great Britain, and Canada. The completion would come at a joint conference in Washington of representatives of government committees and ranking industrial standardization groups from the three countries.

The agreements will not be in the form of a treaty, but will be based on separate documents, each of which is sponsored by the standardization group or groups of each of the countries concerned. These documents, setting forth the Unified Screw Thread Standard, will be in agreement on all fundamental points relating to the standard, but may differ in minor details and will differ in arrangement and general makeup. Purposes of the joint conference are to assure that there is complete agreement on all fundamentals and to celebrate attainment of such agreement after many years of negotiations.

Fabricators Turn to Stainless

MANY fabricators are seeking a cure for steel procurement headaches by turning to fabrication of stainless products, a remedy which has as one recommendation the relatively easy supply of this type of steel.

International Steel Co., Evansville, Ind., is a firm which is developing new uses for stainless and expanding its line of such products. Its latest innovation is an interior, including brine tanks, for refrigerator cars. The interior, 2000 of which are being built for Armour & Co., will replace those formerly made of wood. It permits fresh meat to be racked and suspended; 28 racks can be let down from each side to reach across the 8-foot width of the car. When emptied, steam sterilizes the stainless steel, eliminating the former method of washing interiors of standard meat cars with hot water.

Many other firms have been forced into stainless, and some have discovered the material works so well that they will probably use it permanently. Mill Industries Inc., Chicago, and scores of other makers of coin-operated apparatus have found stainless satisfactory. Chain Belt Co., Milwaukee, has begun manufacture of stainless steel food processing devices. Makers of food-dispensing apparatus are increasingly heavy users of this type of the metal. Anti-Corrosive Metal Products Co. Inc., Castleton-on-the-Hudson, N. Y., only exclusive manufacturer of stainless fastenings in the country, reports its production volume has increased greatly. Demand for its specialty products has risen significantly, and this line now ranges from 12-pound bolts for blast furnaces to safety hooks for window washers.

Stainless production in the United States has increased from 42,000 tons in 1929 to over 500,000 tons last year, with prospects for even higher output this year.

Roach to Head Columbia Steel

ALDEN G. Roach, now president, Consolidated Steel Corp., Los Angeles, will succeed J. Lester Perry as president of Columbia Steel Co., San Francisco, U. S. Steel Corp. subsidiary, Nov. 15.

Mr. Perry was called from retirement in May, 1947, to head Columbia following the death of W. A. Ross. He will remain with U. S. Steel Corp. in an advisory capacity.

Consolidated recently was acquired by U. S. Steel and has been operated as Consolidated Western Steel Corp. Mr. Roach, in addition to heading up Columbia Steel will continue to serve as president of Consolidated.

REINFORCING BARS . . .

REINFORCING BARS PLACED

1400 tons, Veterans hospital, Seattle, to Bethlehem Pacific Coast Steel Corp., Seattle; general contract to Sound Construction & Engineering Co., Seattle.

175 tons, University of Washington arts building, to Bethlehem Pacific Coast Steel Corp., Seattle; S. S. Mullen, Seattle, general contract.

100 tons, Washington state Methow-Carlton state bridge, to Northwest Steel Rolling Mills Inc., Seattle; Turpening & Son, general contract.

REINFORCING BARS PENDING

5000 tons plus Columbia Basin pumping plant, storage reservoir, headworks and other appurtenances; general contract to Peter Kiewit Sons Co., Omaha and Morrison-Knudsen Co., Seattle, $13,300,000.

2000 tons Canyon Ferry dam and powerhouse, $3 million now available; bids to Bureau of Reclamation, Helena, Mont., Dec. 1.

270 tons, psychiatric building, Michael Reese Hospital, Chicago; bids Oct. 26.

100 tons, paper storage building, S. Halsted St. and Chicago river, Time Inc.; bids asked.

Unstated, Gorge diversion dam, Seattle's Skagit power project; bids opened at Seattle, Oct. 21.

STRUCTURAL SHAPES . . .

STRUCTURAL STEEL PLACED

625 tons, building, Divine Providence Hospital, Williamsport, Pa., to Lehigh Structural Steel Co., Allentown, Pa.

350 tons, paper storage building, S Halsted St. and Chicago river, Time Inc., to Bethlehem Steel Co.

290 tons, state highway bridge No. 6501, Duluth, Minn., to Bethlehem Steel Co.

200 tons, high school, E. Peoria, Ill., to Bethlehem Steel Co.

175 tons, factory, R. C. Welden & Co., Phila-

THE S F Co.

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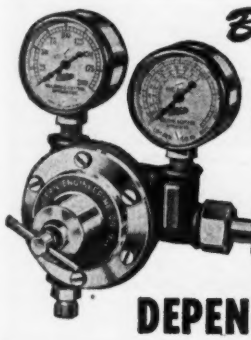
Non-Bessemer
Aluminiferous

"Shenango" Pig Iron
Bessemer
Malleable
Basic — Foundry

The SHENANGO FURNACE Company
Oliver Building, Pittsburgh, Penna.

W. P. SNYDER & COMPANY
Iron Ore • Pig Iron • Coal and Coke • Oliver Bldg., Pittsburgh, Penna.



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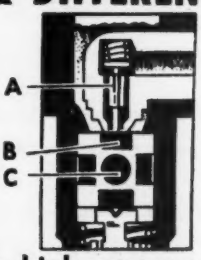

DEPENDABLE because these features give that extra margin of safety necessary to keep equipment operating on the job (where it counts). Diagram shows (A) Safe-T-Chek which protects regulator against damage possible from high pressure valve being opened with regulator screw open. (B) Shows operating seat and (C) Valve block with extra seats ready for immediate service in case of wear to operating seat. DIFFERENT—because *only* Meco has these important features *built-into* every regulator.

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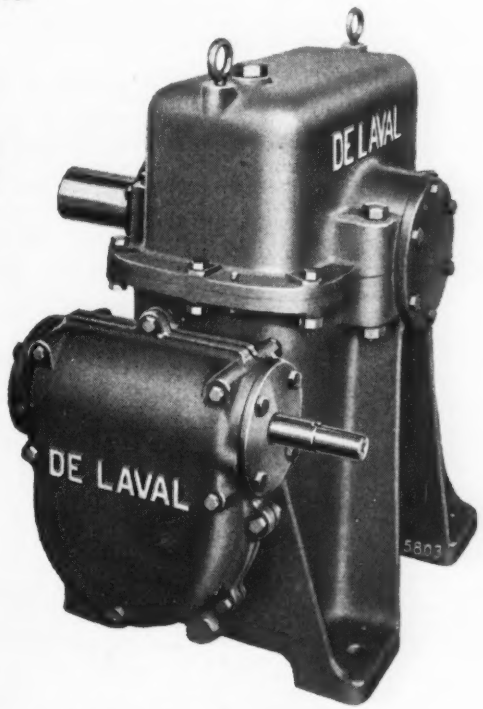

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delphia, to Bethlehem Steel Co.

155 tons, plate girder bridge, W. Allis, Wis., Chicago & Northwestern Railroad, to American Bridge Co.

100 tons, American Legion building, Palmyra, Pa., to Anthracite Bridge Co., Scranton, Pa.

Unstated tonnage, 250-ton electric overhead traveling crane, U. S. Engineer, Nashville, Tenn., to Judson Pacific-Murphy Corp., Emeryville, Calif., $174,870.

STRUCTURAL STEEL PENDING

14,000 tons, state viaduct, Kings county, New York; American Bridge Co., Pittsburgh, low.

1000 tons, plant addition 156-C, Armstrong Cork Co., Lancaster, Pa.; bids closed.

250 tons, theater building, Milwaukee; bids Nov. 15.

225 tons, also 50 tons reinforcing, Washington state steel truss highway White river bridge; bids to Olympia, Oct. 29.

200 tons, main building, Catholic Youth Center, Scranton, Pa.; bids closed Oct. 18.

100 tons, school, Princeton Ave., Philadelphia; bids Oct. 26.

100 tons, public school, Philadelphia; bids Oct. 29.

100 tons, anthracite research laboratory, Schuylkill Haven, Pa.; bids in.

PLATES . . .

PLATES PLACED

1000 tons, plate scroll casings, Baldwin Locomotive Works, Eddystone, Pa., to Bethlehem Steel Co.

PLATES PENDING

100 tons, 200,000-gallon elevated water tank, veterans hospital, San Diego, Calif.; bids Dec. 14, Construction Service, Veterans Administration, Washington.

PIPE . . .

CAST IRON PIPE PENDING

4000 tons, 20 and 24-inch supply and distribution mains, alternatives for steel and other materials; bids to B. W. Boecke, city clerk, Anchorage, Alaska, Nov. 1.

1000 tons, various sizes of cast iron pipe; bids received by Yakima, Wash., Oct. 21.

RAILS, CARS . . .

LOCOMOTIVES PLACED

Canadian Pacific, 23 diesel-electric locomotives; 20 freight and switching locomotives to American Locomotive Co., Schenectady, N. Y., and 3 passenger locomotives to Electro-Motive Division, General Motors Corp., La Grange, Ill.

RAILROAD CARS PLACED

Chicago & Northwestern, 240 fifty-ton box cars, to Pullman-Standard Car Mfg. Co., Chicago.

Great Northern, 1000 box, to own shops at St. Cloud, Minn., and Superior, Wis. This order was erroneously reported in the preceding issue as having been placed by another railroad.

Milwaukee, Kansas & Texas, 500 seventy-ton hoppers, to Pressed Steel Car Co., Pittsburgh.

Mississippi Central, 100 fifty-ton box cars, to Pullman-Standard Car Mfg. Co., Chicago.

Southern Railway, 500 fifty-ton freight cars, to Pullman-Standard Car Mfg. Co., Chicago.

Wisconsin Central, 20 seventy-ton covered hoppers, to General American Transportation Co., Chicago.

RAILROAD CARS PENDING

Denver & Rio Grande, 750 gondolas; bids asked. List comprises 500 fifty-ton drop-bottom, 200 seventy-ton flat-bottom, and 50 seventy-ton mill-type gondolas.

Western Pacific, 200 seventy-ton drop-bottom gondolas and 50 seventy-ton mill type gondolas, pending.

CONSTRUCTION AND ENTERPRISE

ALABAMA

MOBILE, ALA.—Kraft Food Co. has awarded a $100,000 contract to Butler & Cobbs, Bell Bldg., Montgomery, for construction of a warehouse and office.

ARKANSAS

ROSE CITY, ARK.—Arkansas-Louisiana Gas Co., R. W. Curran and Col. T. A. Lane, Corps of Engineers, Little Rock, plans to enlarge its gas system at a cost of $150,000.

CALIFORNIA

BERKELEY, CALIF. — Ames-Harris-Neville Co., 2800 Seventeenth St., San Francisco, is planning to build a $500,000 paper bag plant; Milton Pflueger, 580 Market St., San Francisco, architect.

INGLEWOOD, CALIF.—Sanford Aircraft Inc. has been formed with a capital of $500,000 by Sanford J. Zeiger and Spencer Wright, Inglewood, and Louis G. Viereck, Los Angeles; Harvey & Viereck, 448 South Hill St., Los Angeles, representatives.

LOS ANGELES—Pacific Furnace Corp. of California, 621 S. Hope St., has been issued a building permit for the construction of a $97,000 office building at 1333 West Olympic Blvd.; Howard Hastings Inc., contractor.

MOSS LANDING, CALIF.—Pacific Gas & Electric Co., 245 Market St., San Francisco, has awarded a $52 million contract to Stone & Webster Eng. Corp., Russ Bldg., San Francisco, for construction of an electric generating plant.

UKIAH, CALIF.—Masonite Corp., 111 Sutter St., San Francisco, plans to build a $1 million steel manufacturing plant.

ILLINOIS

CHICAGO—Cuneo Press, 2242 S. Grove St., is contemplating building a $1 million binder and press building; W. W. DeCherrie, 180 W. Washington St., architect.

CRYSTAL LAKE, ILL.—Pure Oil Co., 35 E. Wacker Dr., Chicago, has awarded a $1 million contract to Oscar E. Strom, for construction of an administration and chemical laboratory and engineering laboratory; Stone & Webster Engineering Corp., 33 S. Clark St., Chicago, engineers.

KANSAS

KANSAS CITY, KAN.—Farm Belt Fertilizer Co., 23 St. and State Line, has awarded a $150,000 contract to Long Construction Co., Rialto Bldg., Kansas City, Mo., for erection of a fertilizer plant; S. J. Callahan, Finance Bldg., Kansas City, Mo., engineer.

MARYLAND

BALTIMORE—Friez Instrument Division, Bendix Aviation Corp., Leroy D. Kiley, general manager, Taylor Ave., manufacturer of meteorological and other scientific instruments, plans to erect a manufacturing building.

BALTIMORE—United States Industrial Chemicals Inc., L. A. Helfrich, production manager, is enlarging its laboratory and other research facilities.

BALTIMORE—Tin & Chemical Corp., 1900 Chesapeake Ave., Fairfield, has awarded a $150,000 contract to Austin Co., 19 Rector St., New York, for a steel manufacturing and storage building.

MICHIGAN

FLINT, MICH.—AC Spark Plug Division, General Motors, George Mann Jr., general manager, was granted a permit for an addition to its spark plug plant to be utilized as storage space, permitting present storage space to be used for manufacturing facilities.

NEBRASKA

OMAHA—Fruehauf Trailer Co., 1717 Cass St., has awarded a $300,000 contract to Collins Construction Co., 15 W. 10 St., Kansas City, Mo., for construction of a sales and service

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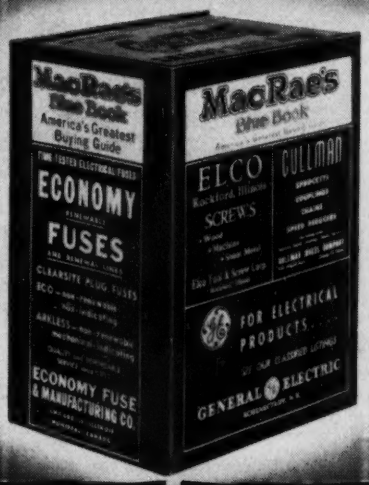

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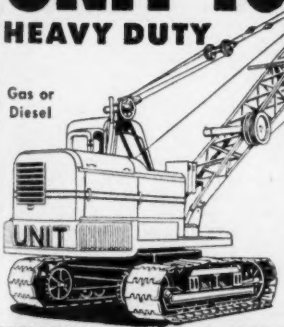

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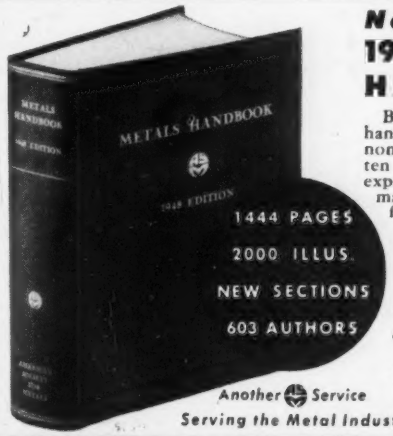

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building at 74th and Dodge Sts.; Harry Wagner, 15 W. Tenth St., Kansas City, Mo., architect.

NEW HAMPSHIRE

DOVER, N. H.—Kidder Press Co. Inc., Broadway, has awarded a $124,000 contract to Harty Construction Co., 25 Huntington Ave., for erection of a machine shop.

NEW JERSEY

SOUTH AMBOY, N. J.—Pennsylvania Railroad, H. T. Frushour, chief engineer, Pennsylvania Station, New York, has awarded a $450,000 contract to Brann & Stewart Co., Broad St., Suburban Station Bldg., Philadelphia, for coal dumping facilities and other additions.

UNION, N. J.—Forstner Chain Co., 646 Nye Ave., Irvington, has awarded a $470,000 contract to Ferber Co., 16 Johnson Ave., Hackensack, for construction of a factory; Epple & Seaman, 901 Broad St., Newark, architects.

OHIO

BATAVIA, O.—Kahle Motors Sales & Service is planning to build a $100,000 binder and press building; Dan M. Reese, 7881 Cooper Rd., Montgomery, architect.

CINCINNATI—Gruen National Watch Case Co., Time Hill, McMillan St., has awarded a $4 million contract to Frank Messer & Sons Inc., 4612 Paddock Rd., for construction of a factory and office, loading dock and boiler plant; Woody Gardner, architect; Hunt & Allen, engineers; both at 914 Main St.

CLEVELAND—Cleveland Cap Screw Co., 2917 E. 79th St., is planning to construct $200,000 addition to its plant at 3330 E. 79th St., to be used for storage purposes.

CLEVELAND—Swift & Co., 3237 W. 65 St., has awarded a $500,000 contract to Hunkin-Conkey Construction Co., 1740 E. Twelfth St., for a meat packing plant addition.

GIRARD, O.—Syro Steel Co., Andrew Syak, president, is planning to build a plant on N. State St. to produce structural steel members to which may be nailed wood, plasterboard or other building materials.

SALEM, O.—Mullins Mfg. Co., has awarded a $200,000 contract to Heller-Murray Co., 222 Ryan Ave. W., Youngstown, for erection of a factory.

OREGON

PORTLAND, OREG.—Portland General Electric Co. is constructing an $800,000 transmission system from Bonneville.

PENNSYLVANIA

MARCUS HOOK, PA.—Sun Oil Co., 1608 Walnut St., Philadelphia, has awarded a $250,000 contract to W. W. Lindsay & Co. Inc., 4 S. Fifteenth St., Philadelphia, for construction of a blending building; C. H. Thayer, engineer.

PHILADELPHIA—Philadelphia Electric Co., 900 Sansom St., Richmond Station, will spend $250,000 for additions and alterations; United Engineers & Constructors Inc., 1401 Arch St., engineers.

TEXAS

GARLAND, TEX.—D. & B. Pump Division, Emsco Derrick & Equipment Co. will build a $875,000 plant to manufacture principally pumps for oil wells.

GRAND PRAIRIE, TEX. — Texas Electric Service Co. will build a $165,000 substation.

UTAH

SALT LAKE CITY, UTAH—Petty Motor Car Co., 909 E. 21 South St., has awarded a $125,000 contract to McCullough Construction Co., 676 G St., for a motor garage including mechanical repair shops; Clifford Evans, Templeton Bldg., architect.

VIRGINIA

ALTAVISTA, VA. — Altavista Mills has awarded a $100,000 contract to English Construction Co. for a weaving plant addition.

PULASKI, VA.—Jefferson Mills has awarded a $500,000 contract to C. M. Guest & Sons, Greensboro, N. C., for a nylon throwing plant addition.

WASHINGTON

SEATTLE—Van Vetter Metal Fabricators, A. R. Van Sant, president, will begin operations at 2130 Harbor Ave. S.W., specializing in fabrication of 10-gage and lighter mild steel, stainless steel, monel and aluminum.

TACOMA—Rainier Steel Corp., Eugene Cunningham, president, is building a fabricating plant on property leased from the Port of Tacoma to produce steel ingots for an Eastern automobile interest. Additional trackage is being installed and preparations made for further development. C. F. Davidson Co., Tacoma, is the contractor.

WISCONSIN

MARSHFIELD, WIS.—Land O' Lakes Creameries Inc., 2201 N. E. Kennedy St., Minneapolis, Minn., has awarded a $215,000 contract to Standard Construction Co., 607 Hamm Bldg., St. Paul, Minn., for construction of a dairy products plant.

WEST ALLIS, WIS.—Fulton Co., 1912 S. 82 St., has awarded a $200,000 contract to Uecker-Samp Co., 1217 N. 71 St., Wauwatosa, for erection of a factory and office; A. H. Siewert, 2716 W. North Ave., Milwaukee, architect.

PRICES OF LEADING FERROALLOYS PRODUCTS

(*Continued from Page* 119)

Ferromanganese Briquets: (Weighing approx. 3 lb and containing exactly 2 lb of Mn). Contract, carload, bulk, 10.00c per lb of briquet, c.l. packaged 10.8c, ton lot 11.6c, less ton 12.5c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicomanganese Briquets: (Weighing approx. 3½ lb and containing exactly 2 lb of Mn and approx. ½ lb of Si). Contract, c.l. bulk 10.0c per lb of briquet, c.l. packed 10.8c, ton lot 11.6c, less ton 12.5c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicon Briquets: (Large size—weighing approx. 5 lb and containing exactly 2 lb of Si). Contract, carload, bulk 5.75c per lb of briquet, c.l. packed 6.55c, ton lot 7.35c, less ton 8.25c. Delivered. Spot, add 0.25c.

(Small size—weighing approx. 2½ lb and containing exactly 1 lb of Si). Carload, bulk 5.90c, c.l. packed 6.70c, ton lots 7.50c, less ton 8.40c. Delivered. Add 0.25c for notching, small size only. Spot, add 0.25c.

Molybdic-Oxide Briquets: (Containing 2½ lb of Mo each) 80.00c per pound of Mo contained, fob Langeloth, Pa.

CALCIUM ALLOYS

Calcium-Manganese-Silicon: (Ca 16-20%, Mn 14-18%, and Si 53-59%). Contract, carload, lump, bulk 19.25c per lb of alloy, carload packed 20.05c, ton lot 21.55c, less ton 22.55c. Delivered. Spot, add 0.25c.

Calcium-Silicon: (Ca 30-33%, Si 60-65%, Fe 1.50-3%). Contract, carload, lump, bulk 17.9c per lb of alloy, carload packed 19.1c, ton lot 21.0c, less ton 22.5c. Delivered, Spot, add 0.25c.

TITANIUM ALLOYS

Ferrotitanium, Low-Carbon: (Ti 20-25%, Al 3.5% max., Si 4% max., C 0.10% max.). Contract, ton lots, 2" x D, $1.40 per lb of contained Ti; less ton $1.45. (Ti 38-43%, Al 8% max., Si 4% max., C 0.10% max.). Ton lot $1.28, less ton $1.35. Fob Niagara Falls, N. Y., freight allowed to St. Louis. Spot add 5c.

Ferrotitanium, High-Carbon (Ti 15-18%, C 6-8%). Contract, $160 per net ton, fob Niagara Falls, N. Y., freight allowed to destination east of Mississippi river and north of Baltimore and St. Louis.

Ferrotitanium, Medium-Carbon: (Ti 17-21% C 3-4.5%). Contract, $175 per ton, fob Niagara Falls, N. Y., freight not exceeding St. Louis rate allowed.

VANADIUM ALLOYS

Ferrovanadium: Open Hearth Grade (Va 35-55%, Si 8-12% max., C 3-3.5 max.). Contract, any quantity, $2.90 per lb of contained Va. Delivered. Spot, add 10c. **Crucible-Special Grades** (Va 35-55%, Si 3.25-4% max., C 0.5-1% max.), $3. **Primos and High Speed Grades** (Va 35-55%, Si 1.50% max., C 0.20% max.), $3.10.

Vanadium Oxide: Contract, less carload lots, $1.20 per lb of contained V_2O_5, fob Bridgeville, Pa. Spot, add 5c.

Grainal: Vanadium Grainal No. 1, 93c; No. 6, 63c; No. 79, 45c; all fob Bridgeville, Pa., usual freight allowance.

TUNGSTEN ALLOYS

Ferrotungsten: (W 70-80%). Contract, 10,000 lb W or more, $2.25 per lb of contained W; 200 lb W to 10,000 lb W, $2.35; less than 2000 lb W, $2.47. Spot, add 2c.

Tungsten Powder: (W 98.8% min.). Contract or spot, 1000 lb or more, $2.90 per lb of contained W; less than 1000 lb W, $3.

ZIRCONIUM ALLOYS

12-15% Zirconium Alloys: (Zr 12-15%, Si 39-43%, Fe 40-45%, C 0.20% max.). Contract, c.l., lump, bulk 6.6c per lb of alloy, c.l. packed 7.35c, ton lot 8.1c, less ton 8.95c. Delivered. Spot, add 0.25c.

35-40% Zirconium Alloy: (Zr 35-40%, Si 47-52%, Fe 8-12%, C 0.50% max.). Contract, carload, lump, packed 20.25c per lb of alloy, ton lot 21c, less ton 22.25c. Freight allowed. Spot, add 0.25c.

BORON ALLOYS

Ferroboron: (B 17.50% min., Si 1.50% max., Al 0.50% max., C 0.50% max.). Contract. 100 lb or more, 1" x D, $1.20 per lb of alloy. Less than 100 lb $1.30. Delivered. Spot, add 5c.

Borosil: (3 to 4% B, 40 to 45% Si), $6.25 per lb contained B, fob Philo, O., freight not exceeding St. Louis rate allowed.

Bortam (B 1.5-1.9%). Ton lots, 45c per lb; smaller lots, 50c per lb.

Carbortam: (B 0.90 to 1.15%). Net ton to carload, 8c per lb, fob Suspension Bridge, N. Y., freight allowed same as high-carbon ferrotitanium.

OTHER FERROALLOYS

Ferrocolumbium: (Cb 50-60%, Mn 5% max., Si 8% max., C 0.5% max.). Contract, ton lot, 2" x D, $2.75 per lb of contained Cb, less ton $2.80. Delivered. Spot, add 10c.

CMSZ Mixes: (No. 4—Cr 45-49%, Mn 4-6%, Si 18-21%, Zr 1.25-1.75%, C 3-4.5%; No. 5—Cr 50-56%, Mn 4-6%, Si 13.50-16.0%; Zr 0.75-1.25%, C 3.50-5%). Carload, 12 M x D, carload packed 19.0c per lb of material, ton lot 19.75c, less ton 21.0c. Delivered.

Silcaz Alloy: (Si 35-40%, Ca 9-11%; Al 6-8%, Zr 3-5%, Ti 9-11%, Boron 0.55-0.75%). Carload, packed, 1" x D, 43c per lb of alloy, ton lot 45c, less ton 47c. Delivered.

SMZ Alloy: (Si 60-65%, Mn 5-7%, Zr 5-7%, Fe 20% approx.). Contract, carload, packed, ½" x 12 M, 16.5c per lb of alloy, ton lots 17.25c, less ton 18.5c. Delivered, Spot, add 0.25c.

Graphidox No. 4: (Si 42-46%, Ca 5%, Ti 9%). C.l. packed, 16.50-17.00c per lb of alloy; ton lots 17.90-18.00c; less ton lots 19.40-19.50, fob Niagara Falls, N. Y.; freight allowed to St. Louis.

V-5 Foundry Alloy: (Cr 38-42%, Si 17-19%, Mn 8-11%; V-7, Cr 28-32%, Si 15-21%, Mn 14-16%). C.l. packed, 14.25c per lb. of alloy; ton lots 15.75c; less ton lots 17.00c, fob Niagara Falls, N. Y.; freight allowed to St. Louis.

Simanal: (Approx. 20% each Si, Mn, Al). Packed, lump, carload 11c, ton lots 11.25c, smaller lots 11.75c per lb alloy; freight not exceeding St. Louis rate allowed.

Ferrophosphorus (23-25% based on 24% P content with unitage of $3 for each 1% of P above or below the base): Gross tons per carload, fob sellers' works, Mt. Pleasant, or Siglo, Tenn.; $65 per gross ton.

Ferromolybdenum: (55-75%). Per lb, contained Mo, fob Langeloth and Washington, Pa., furnace, any quantity 95.00c. Effective Jan. 1, 1949, price will be $1.10, Langeloth.

Technical Molybdic-Oxide: Per lb, contained Mo, fob Langeloth, Pa., packed in bags containing 20 lb of molybdenum, 80.00c.